PIONEER
*The Art of Entertainment*

# Service Manual

• DEH-M980RDS/EW

ORDER NO.
**CRT1450**

MULTI-CD CONTROL HIGH POWER COMPACT DISC PLAYER WITH FM/AM TUNER

# DEH-M980 UC
# DEH-M77 US
# DEH-M940 ES

MULTI-CD CONTROL HIGH POWER COMPACT DISC PLAYER WITH RDS TUNER

# DEH-M980RDS EW, X1B

COMPACT disc DIGITAL AUDIO

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FS JAN. 1992 Printed in Japan

- **CD Player Service Precautions**

1. For pickup unit (CGY1020) handling, please refer to "Disassembly" (Fig.8) During replacement, handling precautions shall be taken to prevent an electrostatic discharge (protection by a short pin).
2. During disassembly,be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

# SAFETY INFORMATION (UC, US MODEL)

## CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

## WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

# SAFETY INFORMATION (EW MODEL)

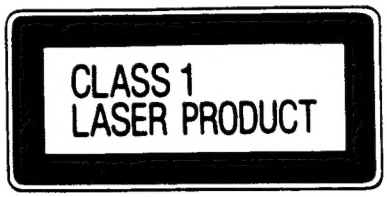
**1. Safety Precautions for those who Service this Unit.**

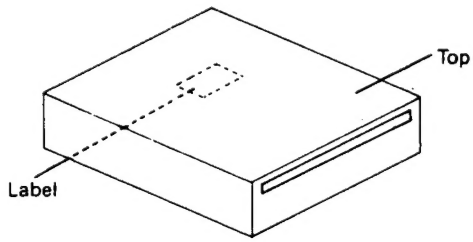
- Follow the adjustment steps(see pages 20 through 39) in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

**Caution:**

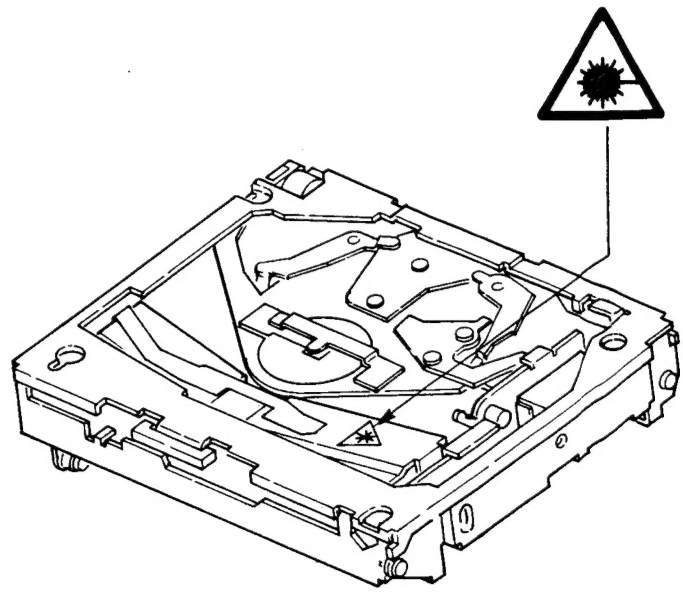
1. **During repair or tests, minimum distance of 13cm from the focus lens must be kept.**
2. **During repair or tests, do not view laser beam for 10 seconds or longer.**

**2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.**




**3. The triangular label is attached to the mechanism unit arm unit.**



**4. Specifications of Laser Diode**

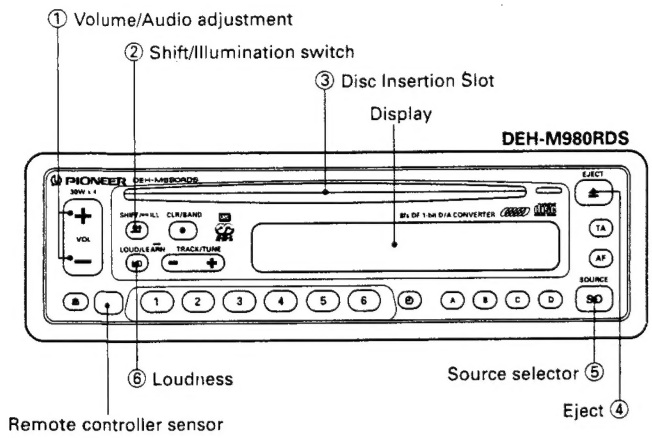
Specifications of laser radiation fields to which human access is possible during service.

Wavelength = 785 nanometers

Radiant power = 69.7 microwatts
(Through a circular aperture stop having a diameter of 80 millimeters)

0.55 microwatts
(Through a circular aperture stop having a diameter of 7 millimeters)

# 1. ADJUSTING VOLUME AND TONE




## Switching Power On

### Tuner

Press button ⑤ to switch the tuner power on. Press button ⑤ again to switch the power off.

### CD Player

When a disc is inserted half-way into the disc insertion slot ③ with its label side upward, the disc is automatically loaded and played. To remove the disc, push button ④.

## Changing the source

To change the source, push button ⑤ with the disc inserted in the slot.
At each press of the button, the source changes as follows: CD player — Tuner — OFF.

When a separately sold multi play CD player is connected to DEH-M980RDS.
Pushing button ⑤ while a disc is inserted changes the source as follows: CD Player — Multi Play CD Player — Tuner — OFF.

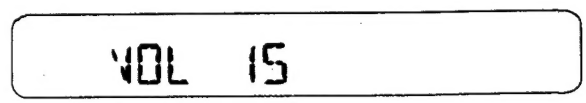
- The source will not change to the multi play CD player when a magazine is not set.

## Adjusting Audio

Press button ① to adjust the volume. Each press of button ② changes the display and the function of button ① as follows:
Volume —Fader — Bass— Middle —Treble — Balance

### Adjusting Volume

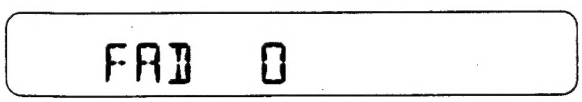
Pressing the (+) side of button ① increases the volume, while the (–) side decreases it.




### Adjusting the Fader

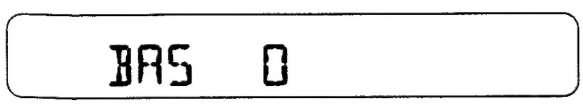
Balancing the sound volume between the front and rear speakers. Gradually transfer the sound to the front speaker by holding down the (+) side of button ①. Gradually transfer the sound to the rear speaker by holding down the (–) side of button ①.

- Please set FAD at 0 when using a two-speaker system.




### Adjusting Bass

Pressing the (+) side of button ① increases bass, while the (–) side decreases bass.

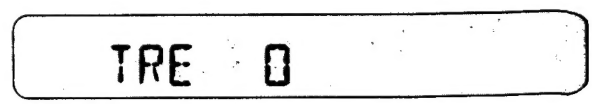



### Adjusting Middle

Pressing the (+) side of button ① increases middle, while the (–) side decreases middle.

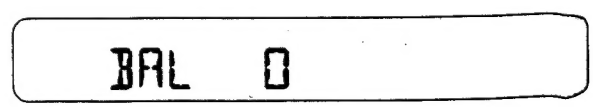
### Adjusting Treble

Pressing the (+) side of button ① increases treble, while the (–) side decreases treble.




### Adjusting Balance

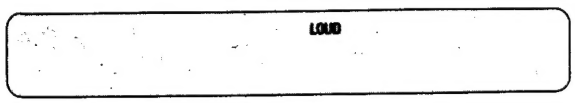
Pressing (+) side of button ① shifts the balance to the left speaker, while the (–) side shifts it to the right speaker.



- When you're adjusting fader, bass, middle, treble, or balance settings, the indicator will stop at the center setting. About 5 seconds after adjustment has been made, the display returns to its previous state.

## Using the Loudness Function

Press button ⑥ and the LOUD indicator will appear on the display. This "loudness" function enhances both the high and low ranges of sound to give even more power to output even at low volumes.

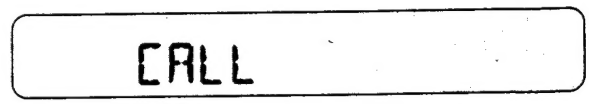



## Switching Illumination Colour

Pressing button ② for more than 2 seconds causes the illumination color to switch between green and amber.

### Regarding the Cellular Telephone Muting

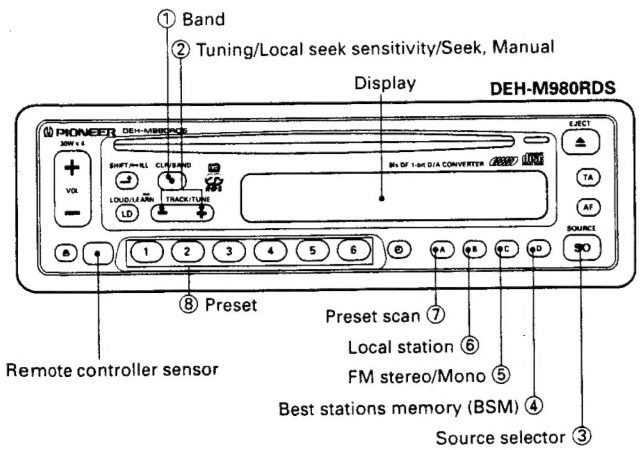
When the audio mute terminal of a separately sold PIONEER cellular telephone is connected to the cellular mute terminal of the unit, the following function becomes active.
When a phone call is received or made on the cellular telephone, the volume is automatically lowered by the unit, and CALL is shown on the display.

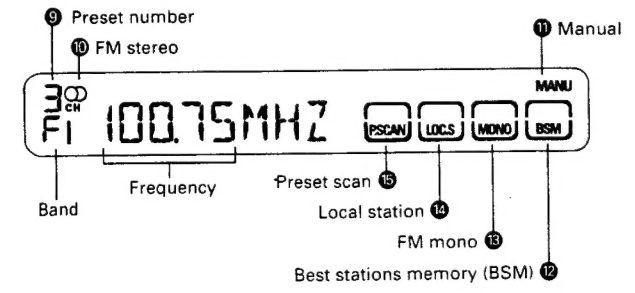



When a call is ended, the volume returns to the previous level and the previous display is shown again.

- When the volume is lowered by the operation of the cellular telephone muting function (**"CALL"** is shown on the display, the unit's shift Button ② and the attenuator button of the remote controller unit are disabled.

# 2. USING THE RADIO




1 Turn on the tuner's power by pressing button ③. Each time the button is pushed the main unit switches between tuner and power off modes.

- This operation will differ if there is a CD inserted in the CD player, or if the separately available multi play CD player is connected.

2 Press Button ① to select a band.

F I → F II → F III → M/L
(FM1) (FM2) (FM3) (MW/LW)

Use button ② to switch between MW (531-1,602 kHz) and LW (153-281 kHz).

3 Use seek tuning to tune in a frequency.
Ensure that **"MANU"** ⑪ is not indicated on the display. (If so, turn it off by simultaneously pressing the (+) and the (–) sides of button ②).
Press either the (+) side or the (–) side of button ②. When the (+) side is pressed, the tuner will automatically receive high frequencies.
When the (–) side is pressed, it will automatically receive low frequencies.

4 Adjust volume and tone.

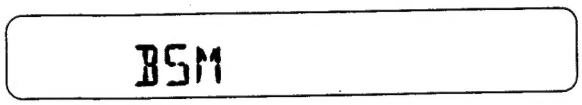
5 Assign the tuned frequency to one of the Buttons in Bank ⑧ (preset memory).
Press and hold down one of the buttons in Bank ⑧ for at least two seconds. The frequency is assigned to the selected button when the preset number ⑨ stops flashing on the display. Up to 18 FM stations (6 each for FM1, FM2 and FM3), and six MW/LW stations can be assigned to the preset memory buttons in Bank ⑧.

[6] Once a frequency is assigned to a Button in Bank ⑧, you just need to press that Button to tune it in.
This also causes the number of the button pressed to appear at Position ❾ on the display.

## BSM (Best Stations Memory)

This function automatically locates stronger stations and automatically assigns their frequencies to the buttons in Bank ⑧, from strongest to weakest. It comes in handy when trying to find local stations while driving.

1. Press button ① and select a band.
2. Hold down button ④. After about two seconds, a"beep" will sound to signal that the BSM search has started. At this time, "**BSM**" will flash on the display.




3. The frequency display will return once BSM search is complete, and frequencies are assigned to buttons 1 through 6 in Bank ⑧.

- At the end of the BSM search, the displayed frequency is that assigned to button [1] of Bank ⑧.
- If there are fewer than six strong stations in the area, some of the buttons in Bank ⑧ will not be assigned frequencies, so they will retain any frequencies assigned to them previously.
- BSM search may take as long as 30 seconds in areas where there are few strong stations.
- You can cancel BSM search by pressing button ④ again.

## Preset Scan Tuning

This function lets you automatically monitor the stations assigned to the preset buttons.

1. Pressing button ⑦ turns on the frame of preset scan ❺ and flashes preset number ❾.
   Each station assigned to the buttons in Bank ⑧ will be automatically tuned in for about eight seconds.
2. When you hear a station that you like, press button ⑦ again to cancel preset scan tuning and remain at that station.

## Manual Tuning

Use manual tuning when stations are too weak to be picked up by seek tuning.

1. Turn on "**MANU**" ❶ by simultaneously pressing the (+) side and the (–) side of button ②.
2. Each press of the (+) side of button ② increases the frequency in 50 kHz steps in the FM band, 9 kHz in the MW band and 1 kHz in the LW band. Pressing the (–) side of button ② decreases the frequency. Holding down either side of button ② changes the frequency at high speed.

## Switching between FM Stereo and Mono

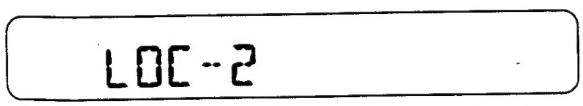
Generally, it is best to allow the ARC (Automatic Reception Control) function to automatically set the optimum listening conditions. ⓒⓓ ❿ turns on during stereo broadcast is in reception. When there is a large amount of noise, you can press button ⑤ for clearer mono reception (The frame of FM mono ❸ turns on).

## Adjusting Seek Sensitivity

The seek tuning function of this tuner lets you select between a local setting for reception of strong stations only, and a DX (distant) setting for reception of weaker stations. The local setting also has four seek tuning sensitivity levels for FM and two levels for MW/LW to match local conditions.

## Changing the Local Seek Sensitivity

1. Use button ① to select a band.
2. Hold down the button ⑥ for more than two seconds, and the display will show you the current local seek sensitivity for about five seconds.



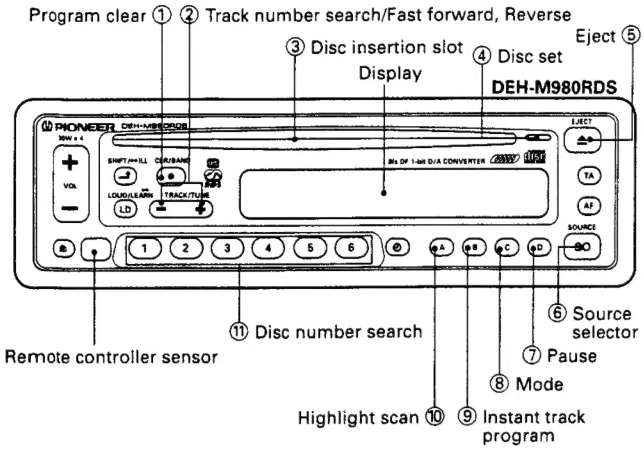

3. While the local seek sensitivity remains on the display, press the (+) side of button ② to increase the sensitivity level, and the (–) side to decrease the level as shown below.
   FM : LOC-1 ⇄ LOC-2 ⇄ LOC-3 ⇄ LOC-4
   MW/LW : LOC-1 ⇄ LOC-2
   The LOC-4 setting allows reception of only the strongest stations, while lower settings let you receive progressively weaker stations.

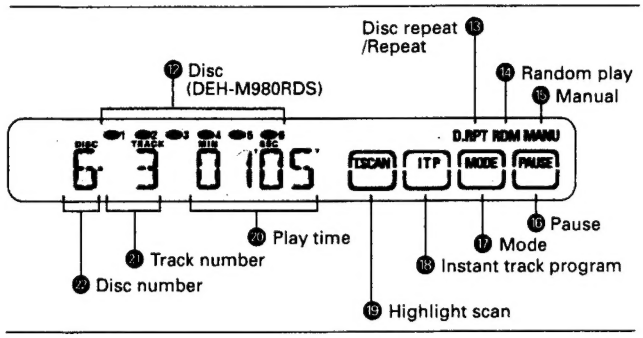
- The display of local seek sensitivity returns to the frequency when about five seconds have elapsed after the change of sensivity.

## Switching between Local and DX

Press button ⑥ to switch between Local and DX (distant) seek tuning. When the frame of local seek ❹ is lit, seek tuning is performed with the local seek sensitivity. Otherwise, seek tuning is performed with the DX seek sensitivity.

# 3. PLAYING COMPACT DISCS




## Playing Discs on the Main Unit's Built-in CD Player

1 On inserting the CD, with the label side up, half way into the CD slot ③, it will automatically be set into position and start to play. The track number ㉑ and playback time ⑳ indicators will light.

2 Adjust the volume and tone controls.

3 To stop CD playback, press button ⑥ turning the power off.
Pressing the button will change the source as follows: CD Player — Tuner — OFF.
Press button ⑥ again to restart playback. It will play from close to where it was previously stopped.

4 To remove or change discs, press button ⑤.
When the disc is ejected, pressing it will cause it to be set into position again, and playback to start.

**Note:**
- If a disc can only be inserted halfway, or if the disc does not play after being loaded, something may be wrong with the disc. Eject the disc by pressing button ⑤, and check it. If it is all right, insert it again.
- Insert the disc with its label (printed) side facing up. If the disc is inserted with the label side facing down, it will not play, and the recorded side may be damaged.
- The disc is set when disc set light ④ is lit. If another disc is inserted into the slot at this time, the discs may be damaged or the player may malfunction.
- Do not insert two discs into the slot at the same time. This may cause a malfunction.
- When a disc in which there are several seconds between tracks is used, the amount of elapsed disc-play time is shown, for example, as –01 and –00.

## Using the multi play CD Player

The Magazine Type Multi-Play CD players with mark and the Magazines with the same mark are compatible for 5-inch (12 cm) discs.

- A separately available multi play CD player (such as the CDX-M40) is required.

1 When button ⑥ is pressed, the multi play CD player's power is turned on, and the disc number ㉒, track number ㉑, and playback time ⑳displays will light.
Pressing the button will change the source as follows: CD Player — Multi Play CD Player — Tuner — OFF.

- The source will not switch to the CD player if a disc is not inserted in the built-in CD player.
- When the multi play CD player is first connected to the main unit, the system may not operate correctly. (For example, the multi play CD player may not be selected by pushing button ⑥.) In this case, press the clear buttons on both the main unit and the multi play CD player.

2 Select a disc using disc number search.
Use the buttons ⑪ to select the desired disc. The number of the selected disc will be displayed in the display ㉒
- Display ⑫indicates whether the magazine is loaded or empty.
- If there is a tray without a disc in the magazine, that tray number will not be selected even if its button is pushed.

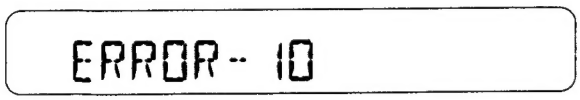
3 Adjust the volume and tone.

4 To stop play, switch the power off by pressing button ⑥.
Pressing the button will change the source as follows: CD Player — Multi-play CD player — Tuner — OFF.
Press button ⑥ again to restart playback. It will resume play from close to where it was stopped.
- When the multi play CD player (CDX-M100) is installed, if playback is stopped and then restarted, it will resume play at the beginning of the track that was stopped.

**Note:**
- After you press a Button in Bank ⑪, it may take some time before play begins due to the time necessary to load and set the disc in the mechanism.
- When a disc in which there are several seconds between tracks is used, the amount of elapsed disc-play time is shown, for example, as –01 and –00.

## Error mode

Should an abnormality occur – for example, the built-in CD player or multi play CD player cannot be operated, or the music stops during CD playback – the main unit will indicate an error mode.




While it the unit is in error mode, a number will be displayed indicating the cause of the error, so please check the items listed below. If you cannot fix the problem after checking the cause of the error, please contact your dealer or your nearest Pioneer service center.

**Note:**
When using the multi-play CD player, CDX-M100, CDX-M70, CDX-M50 and CDX-M40, an error will be displayed only in the form of "ERROR-", without the number which indicated the cause of the error. When this display appears, please check items 11, 12, or 30 listed below.

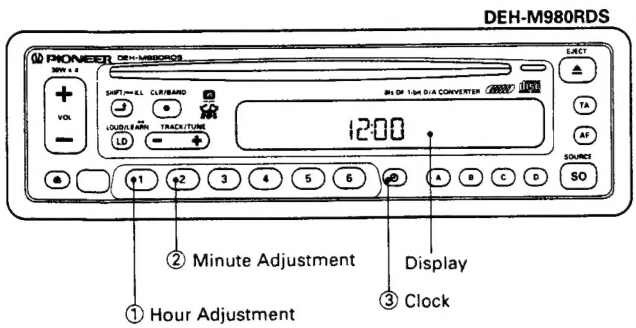
| Display | Cause | Treatment |
|---|---|---|
| 10 | The CD player is not set for CD performance mode. | |
| 11 | Dirt or a scratch on the disc stops the laser beam from being able to focus.<br>The disc has been inserted upside down. | Wipe off the dirt.<br>Exchange the disc if it has been scratched.<br>Confirm that the disc has been inserted right side up. |
| 12 | Discs (such as CD-ROM) other than audio discs are used. | Please set the disc for audio. |
| 30 | Dirt or a scratch on the disc hinders the track number search function. | Wipe the dirt off the disc.<br>Exchange the disc if it is scratched. |
| AO | CD player power fault. | |

### HEAT indicator

To prevent deterioration in the semi-conductor laser from over-heating, playback of a CD will stop when the temperature surrounding the main unit and the multi play CD player rise during play.
When this occurs, "**HEAT**" will be indicated on the display. Please wait until the temperature drops.

- This function refers to the CD player component of the main unit and to the multi play CD player CDX-M100. It does not refer to other multi play CD players.

# 4. USING THE CLOCK DISPLAY




## Displaying the Time

The clock is displayed while button ③ is depressed. Press button ③ again to turn off the clock display.

- The clock display can be used only when the main unit is in operation.
- When the clock display is ON, pressing other buttons will release the clock display. The display will be restored approximately 25 seconds after the button operation has been completed.

## Adjusting the Time

### Adjusting the Hours

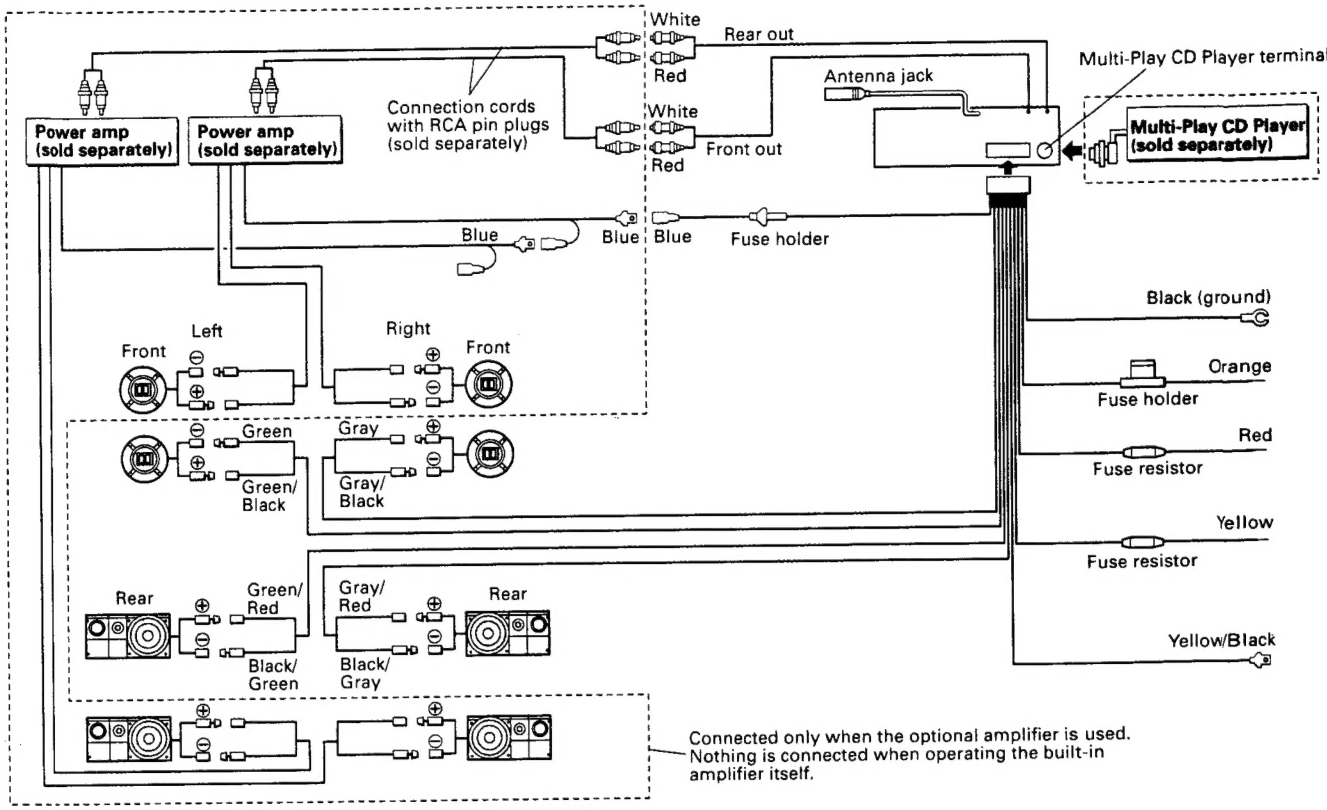
While holding down button ③, press button ① to adjust the hour setting of the clock. Each press of button ① advances the hour setting by one hour, and holding it down advances the setting at high speed.

### Adjusting the Minutes

While holding down button ③, press button ② to adjust the minute setting of the clock. Each press of button ② advances the minute setting by one minute, and holding it down advances the setting at high speed.

# 5. CONNECTING THE UNITS

## DEH-M980RDS Connection Diagram




# 6. FEATURES

- Multi CD Control function for full control over optional magazine type multi-play CD player.
- An 8-times-oversampling digital filter and 1-bit digital-to-analog converter allow CD's to be played with exceptional fidelity.
- Various selection functions (track number search, highlight scan, fast forward and reverse).
- RDS system provides automatic Alternative Frequency reception, Network/station name display, and traffic information reception.
- Built-in highly sensitive "Automatic Reception Control" (ARC) for automatic control of stereo separation, muting, and frequency characteristics to match the strength of the FM signal.
- The Best Stations Memory automatically memorizes the six best (strongest) stations in the six preset buttons in the order of their strength.
- Removable front panel protects against theft.
- It is possible to add the built-in high power amplifiers (30 W × 4) four-speaker system, using optional outside amplifiers to create an eight-speaker system.

# 7. SPECIFICATIONS

## DEH-M980RDS/EW

**General**

Power source ..... 14.4 V DC (10.8 – 15.6 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10 A
Dimensions (chassis) ..... 180(W) × 50(H) × 155(D) mm
(front face) ..... 188(W) × 58(H) × 18(D) mm
Weight ..... 1.6 kg

**Amplifier**

Max. power output ..... 30 W × 4
Continuous power output ..... 14 W × 4
(1 % dist. at 1 kHz)
Load impedance ..... 4 Ω (4 – 8 Ω allowable)
Nominal output level/
output impedance (pre out) ..... 500 mV/1 kΩ
Tone controls (bass) ..... ±12 dB (100 Hz)
(middle) ..... ±12 dB (1 kHz)
(treble) ..... ±12 dB (10 kHz)
Loudness contour ..... +10 dB (100Hz), +6.5 dB (10 kHz)
(volume: –30 dB)

**CD player**

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Frequency characteristics ..... 5–20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IEC-A network)
Dynamic range ..... 90 dB (1 kHz)
Number of channels ..... 2 (stereo)

**FM tuner**

Frequency range ..... 87.5 – 108 MHz
Usable sensitivity ..... 8 dBf (0.7 µV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 13 dBf (1.2µV/75 n, mono)
Signal-to-noise ratio ..... 70 dB (IEC-A network)
Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 40dB (at 65 dBf, 1 kHz)

**MW tuner**

Frequency range ..... 531–1,602 kHz
Usable sensitivity ..... 18 µV (25 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

**LW tuner**

Frequency range ..... 153-281 kHz
Usable sensitivity ..... 30 µV (30 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

**Note:**
Specifications and the design are subject to possible modification with-out notice due to improvements.

## DEH-M980/UC, M77/US

**General**

Power source ..... 14.4 V DC (10.8 – 15.6 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10 A
Dimensions (chassis) ..... 178(W) × 50(H) × 155(D) mm
[7(W) × 2(H) × 6-1/8(D) in.]
(nose) ..... 188(W) × 58(H) × 18(D) mm
[7-3/8(W) × 2-1/4(H) × 3/4(D) in.]
Weight ..... 1.6 kg (3.5 lbs)

**Amplifier**

Continuous power output is 10 W per channel min. into 4Ω, both channels driven 50 to 15,000 Hz with no more than 5% THD.
Max. power output ..... 30 W × 4 (EIAJ)
Load impedance ..... 4 Ω (4 – 8 Ω allowable)
Nominal output level/
output impedance (pre out) ..... 500 mV/1 kΩ
Tone controls (bass) ..... ±12 dB (100 Hz)
(middle) ..... ±12 dB (1 kHz)
(treble) ..... ±12 dB (10 kHz)
Loudness contour ..... +10 dB (100Hz), +6.5 dB (10 kHz)
(volume: –30 dB)

**CD player**

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Frequency characteristics ..... 5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IHF-A network)
Dynamic range ..... 90 dB (1 kHz)
Number of channels ..... 2 (stereo)

**FM tuner**

Frequency range ..... 87.9 – 107.9 MHz
Usable sensitivity ..... 8 dBf (0.7 µV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 13 dBf (1.2µV/75 n, mono)
Signal-to-noise ratio ..... 70 dB (IHF-A network)
Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 40dB (at 65 dBf, 1 kHz)
Selectivity ..... 70dB (2ACA) (±400 kHz)
Three-signal intermodulation (desire signal level)
..... 35 dBf (two undesire signal level: 110 dBf)

**AM tuner**

Frequency range ..... 530 – 1,710 kHz
Usable sensitivity ..... 18 µV (25 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (±10 kHz)

*These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.*

**Note:**
Specifications and the design are subject to possible modification with-out notice due to improvements.

# 8. BLOCK DIAGRAM

• **DEH-M980RDS/EW**

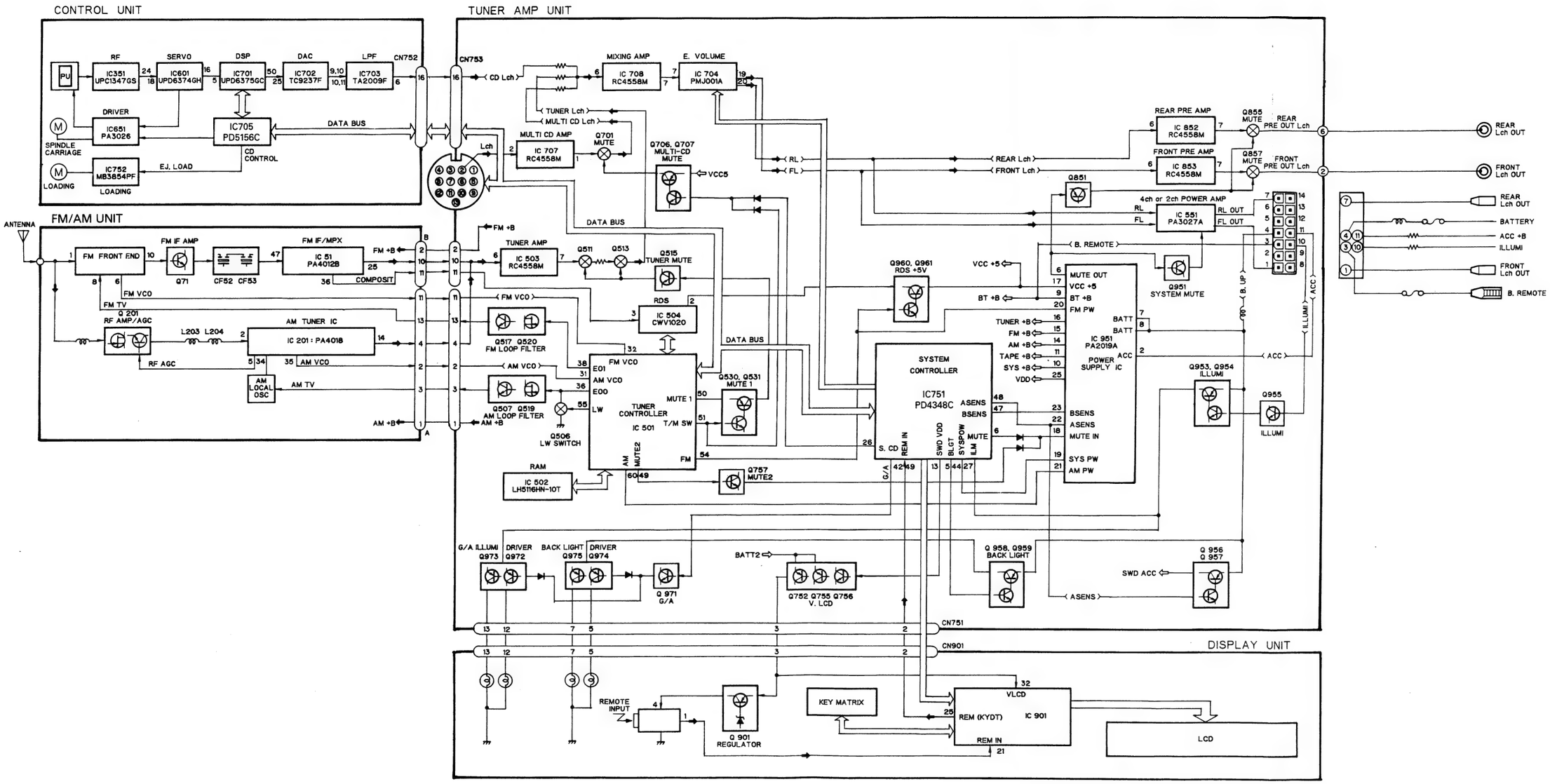



Fig. 1

- **DEH-M980/UC, M940/ES**

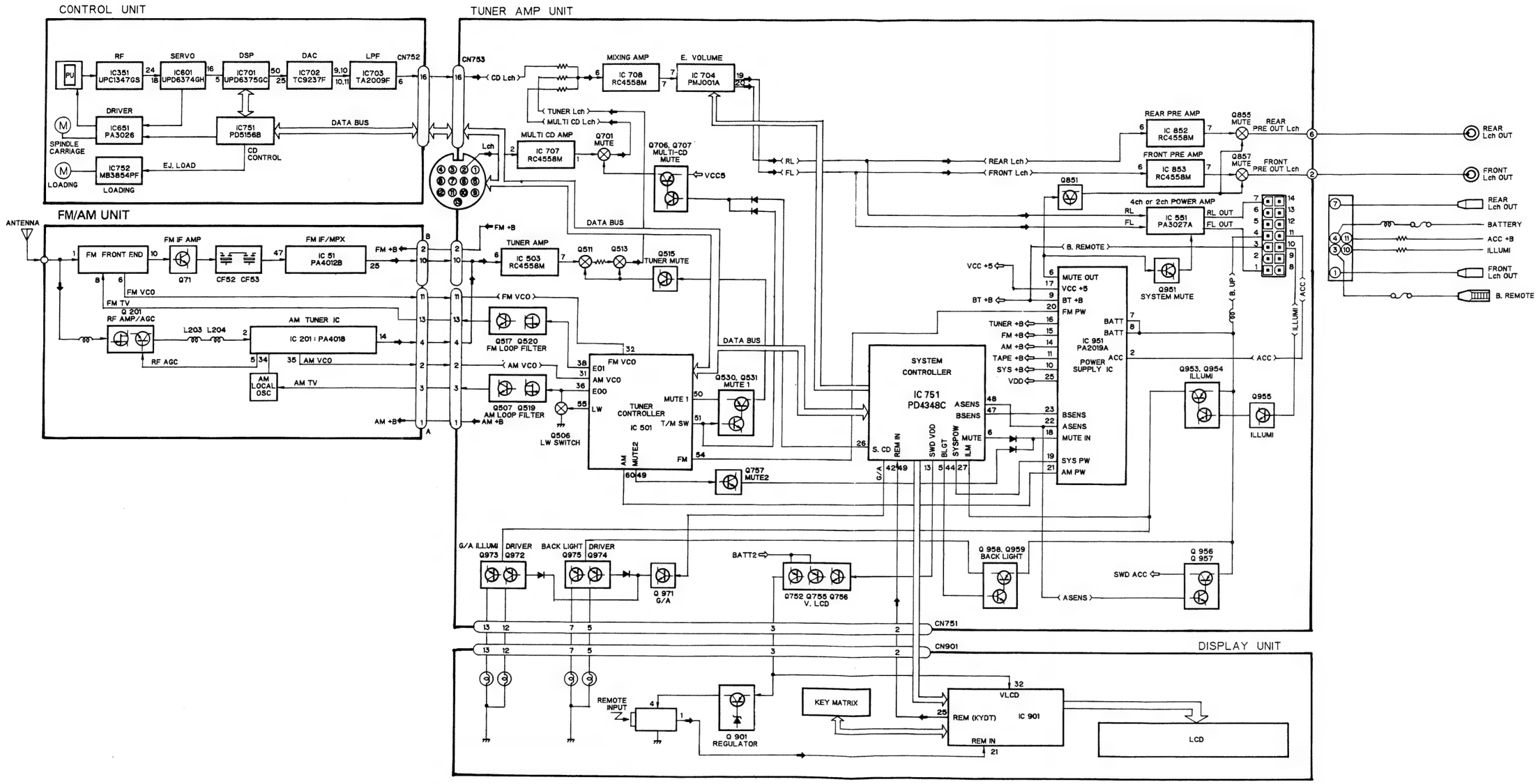



Fig. 2

• **DEH-M77/US**

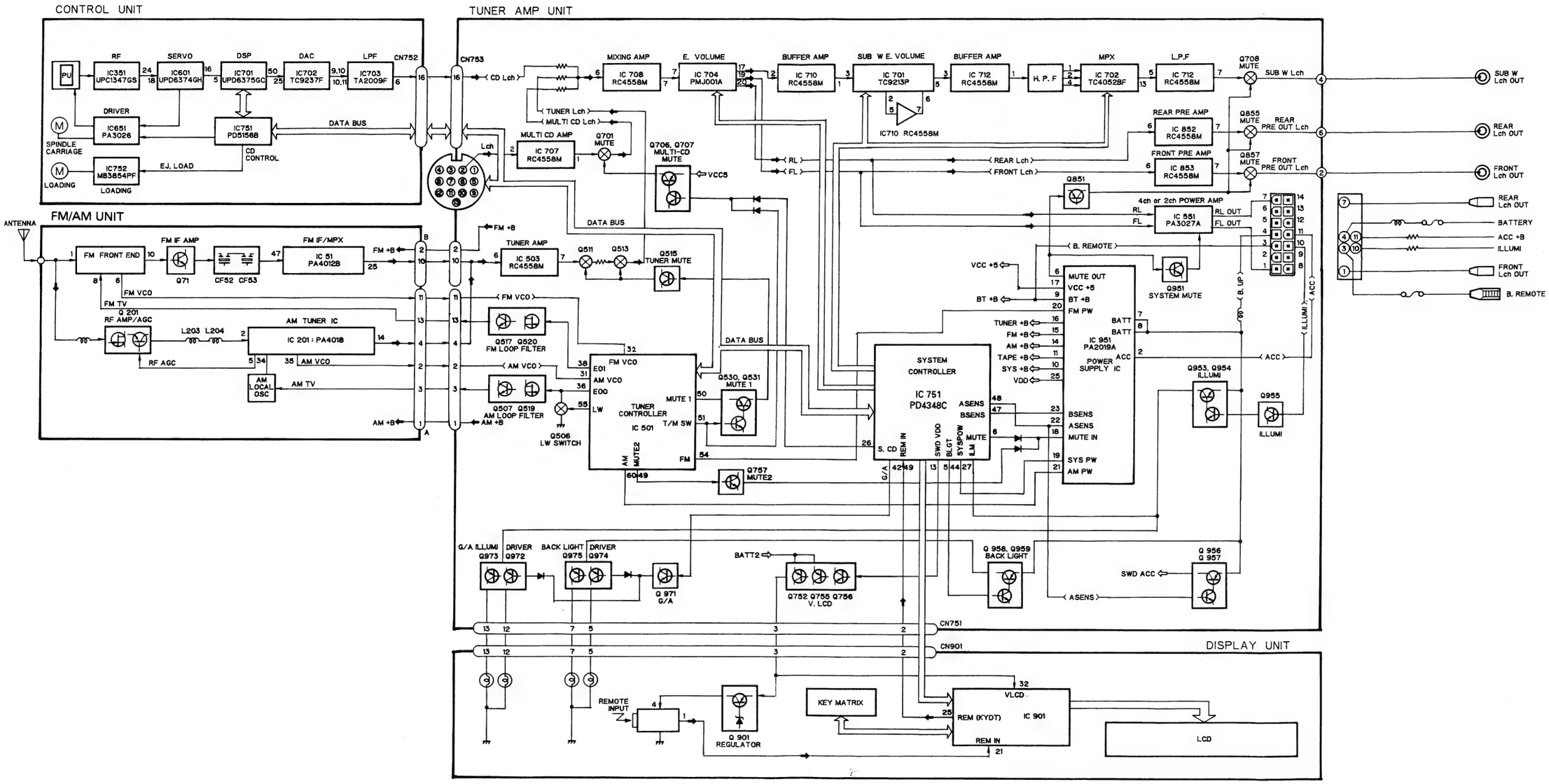



Fig. 3

# 9. DISASSEMBLY

**• Case**

1. Remove the three screws.
2. Insert and turn a screwdriver at locations indicated by arrows to remove the case.

**• Front Panel**

1. Press the detach button, and then pull front panel.

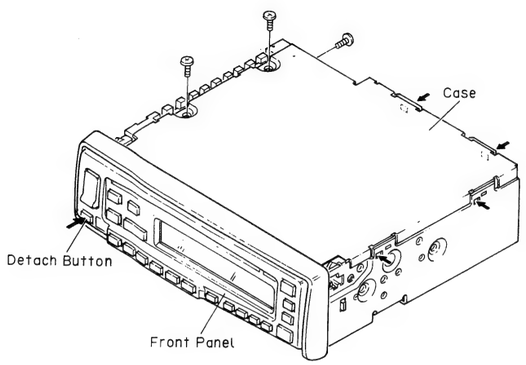



Fig. 4

**• Grille Unit**

1. Disconnect the two stoppers indicated by arrow.
2. Disconnect the connector.
3. Remove the grille unit.

**• CD Mechanism Module**

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the CD mechanism module.

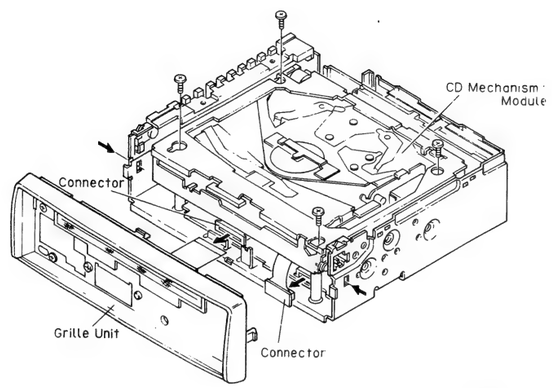



Fig. 5

1. Remove the four screws A and the three screws B.
2. Remove the heat sink.
3. Remove the three screws C and the screw D, and then remove the holder.
4. Stretch the four claws.
5. Remove the chassis unit.

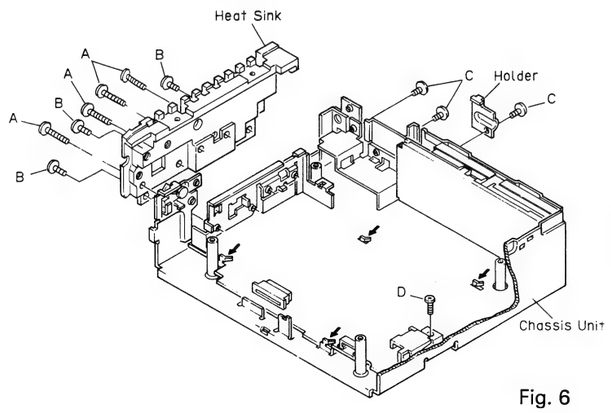



Fig. 6

**• PU Unit, Carriage Motor Assy**

1. Remove the spring B as indicated by the arrow. (Fig.7)
2. Remove the spring A. (Fig. 7)
3. Remove the engagement as indicated by the arrows 1 and 2, and then remove the clamper assy. (Fig. 7)

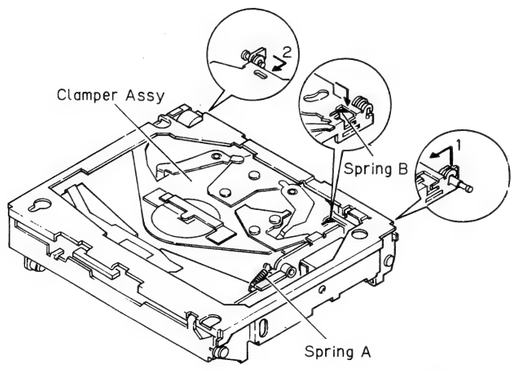



Fig. 7



4. Fix short pin when removing the CN351 connector. (For protection of the PU unit.) (Fig. 8)
5. Remove the three screws. (Fig. 8)
6. Since the control unit is connected to the switch substrate by means of connector, disconnect the connector and then remove the control unit right downward. (Fig. 8)

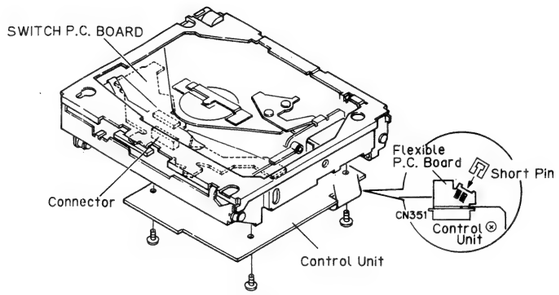



Fig. 8

11. Remove the screw, and then remove the carriage motor assy. (Fig. 10)

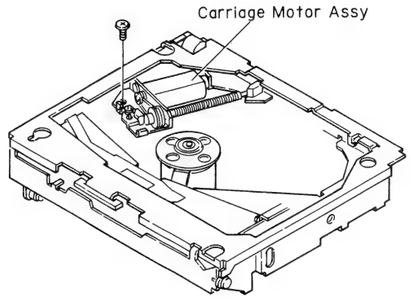



Fig. 10

7. Hook the spring as shown in the figure. (Fig. 9)
8. Remove the holder and screw. (Fig. 9)
9. Remove the flexible P.C. board. (Fig. 9)
10. Remove the PU unit. (Fig. 9)

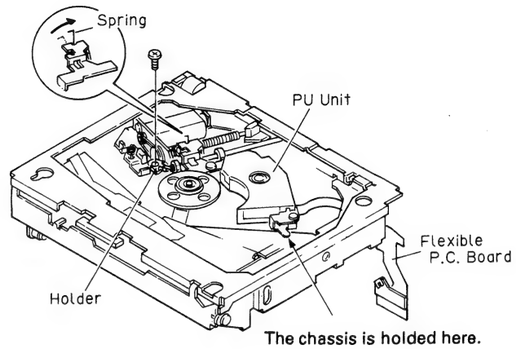



Fig. 9

**• Damper Unit, Loading Motor**

1. Turn the gear A manually in the arrow direction. (Fig. 11)
2. Press the rack gear in the arrow direction and engage gears. (Fig. 11)
3. Put into the play mode. (The clamper assembly is at low position.) (Fig. 11)

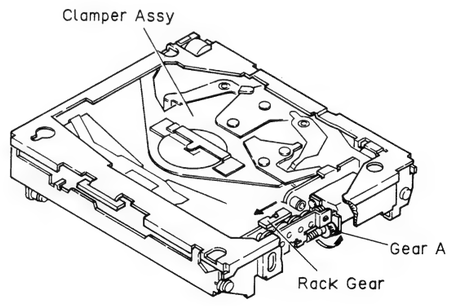



Fig. 11

4. Remove the four springs indicated by arrow. (Fig. 12)
5. Remove the two screws A, and then remove the side frame assy. (Fig. 12)
6. Remove the two screws B, and then remove the damper assy. (Fig. 12)

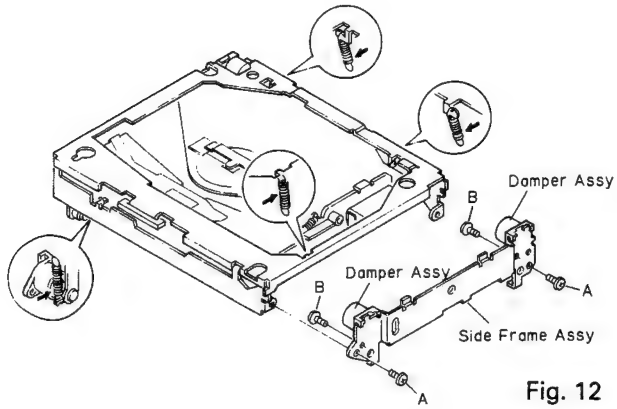



Fig. 12

7. Remove the frame assembly from the mechanical parts. (Fig. 13)
8. Remove the two screws C, and then remove the damper assy. (Fig. 13)
9. Remove the clamper assembly as shown in Fig. 13.

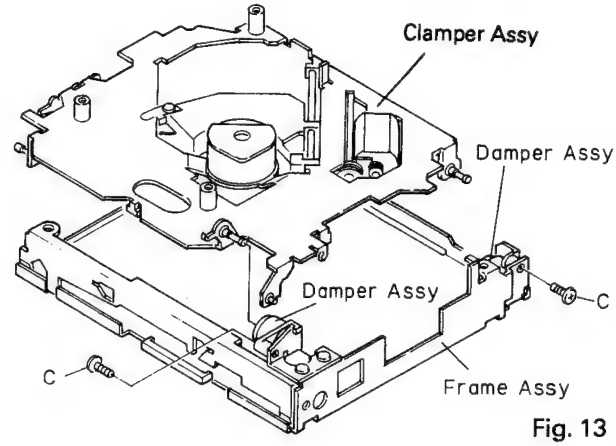



Fig. 13

10. Turn the Loading gear to put into the ejection. (Fig. 14)
11. Remove one of the screws and remove the gear unit pressing the arm slightly toward the arrow. (Fig. 14)

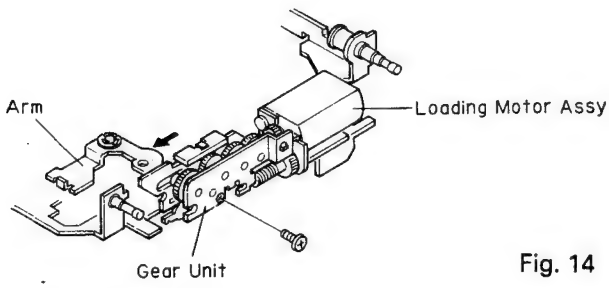



Fig. 14

12. Remove the screw, and then remove the loading motor assy. (Fig. 15)

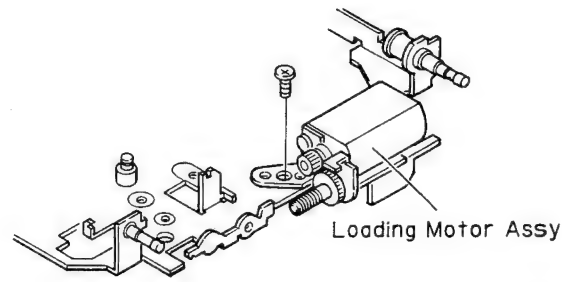



Fig. 15

- **Gear Unit**

13. Shift lever as shown in Fig. 16.
14. Remove the shaft A from C of lever.
15. Shift the gear as shown in Fig. 16.
16. Remove the shaft B from C of lever.

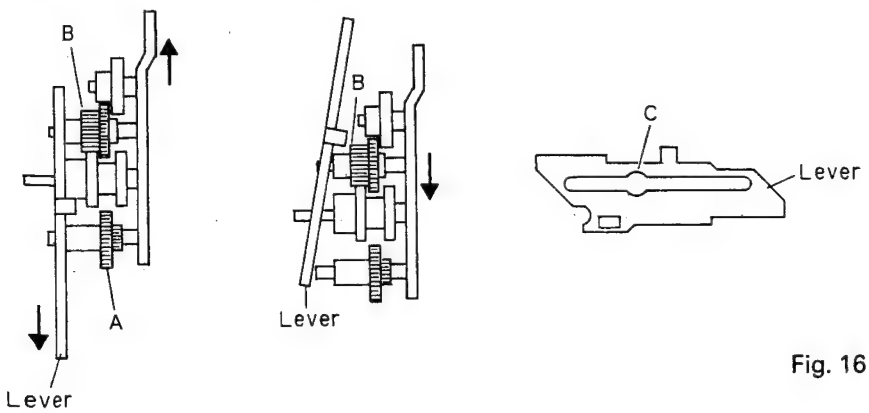



Fig. 16

# 10. ADJUSTMENT

1)Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential,therefore,is connected to REFOUT(approx. 2.5V) instead of GND.

If REFOUT and GND are connected to each other by mistake during adjustments,not only will it be impossible to measure the potential correctly,but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this,take special note of the following.

Do not connect the negative probe of the measuring equipment to REFOUT and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFOUT with the channel 2 negative probe connected to GND.

And since the frame of the measuring instrument is usually at the same potential as the negative probe,change the frame of the measuring instrument to floating status.

If by accident REFOUT comes in contact with GND,immediately switch the regulator or power OFF.

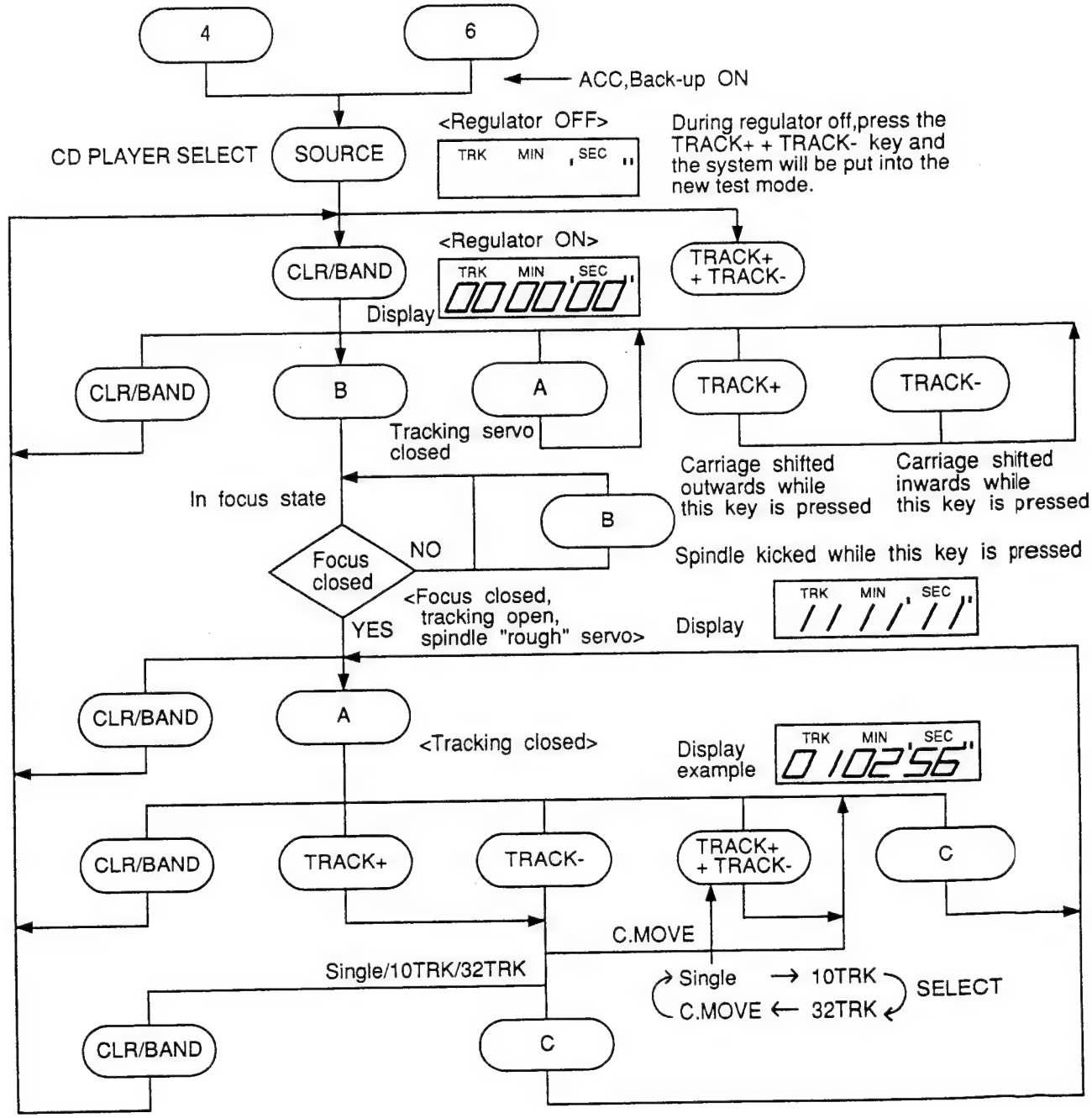
- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON,let the player run for about one minute to allow the circuits to stabilize.
- Since the protective systems in the unit's software are rendered inoperative in test mode,be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.
- Test mode starting procedure
  Switch ACC,back-up ON while pressing the 4 and 6 keys together.
- Test mode cancellation
  Switch ACC,back-up OFF.
- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently,if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment,the following malfunctions may occur.
  *During PLAY, even if the eject button is pressed,the disc will not be ejected and the unit will remain in the PLAY mode.
  *The unit will not load a disc.
  When the unit malfunctions this way,either reposition the light source,move the unit or cover the photo transistor.
- When loading and unloading discs during adjustment procedures,always wait for the disc to be properly clamped or ejected before pressing the another key. Otherwise, there is risk of the actuator being destroyed.
- Turn power off when pressing the TRACK+ or the TRACK- key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)

| Key | Function |
|---|---|
| CLR/BAND | RegulatorON/OFF |
| TRACK+ | FWD Kick |
| TRACK- | REV Kick |
| EJECT | EJECT |
| TRACK+ + TRACK- | Jump mode |

| Key | Function |
|---|---|
| A(SCAN) | Tracking close |
| C(MODE) | Tracking open |
| B(ITP) | Focus close |
| SOURCE | CD ON/OFF |

- SINGLE/10TRK/32TRK will continue to operate even after the key is released.Tracking closed the moment C-MOVE is released.
- JUMP MODE resets to SINGLE as soon as power is off.

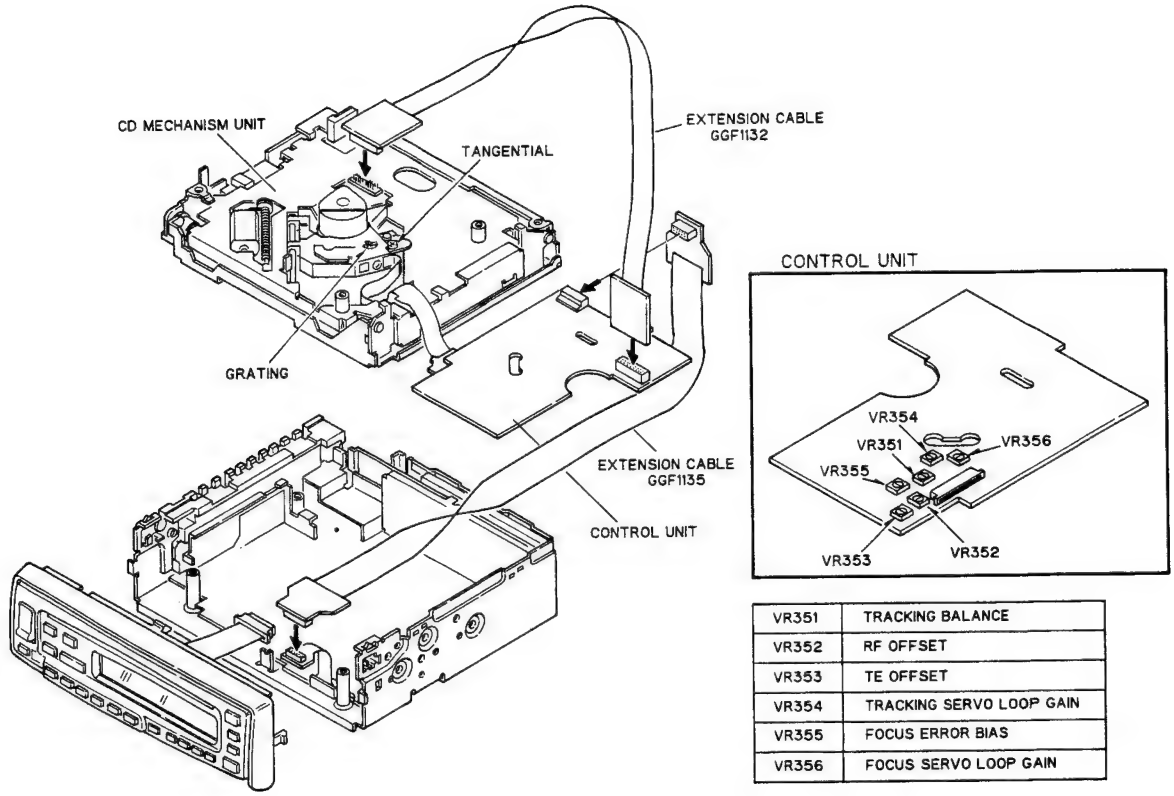
• **Flow Chart**


4
6
ACC,Back-up ON
CD PLAYER SELECT
SOURCE
<Regulator OFF>
TRK MIN SEC
During regulator off,press the TRACK+ + TRACK- key and the system will be put into the new test mode.
<Regulator ON>
CLR/BAND
TRACK+ + TRACK-
Display
TRK MIN SEC
CLR/BAND
B
A
TRACK+
TRACK-
Tracking servo closed
Carriage shifted outwards while this key is pressed
Carriage shifted inwards while this key is pressed
In focus state
B
Focus closed
NO
YES
<Focus closed, tracking open, spindle "rough" servo>
Spindle kicked while this key is pressed
Display
CLR/BAND
A
<Tracking closed>
Display example
CLR/BAND
TRACK+
TRACK-
TRACK+ + TRACK-
C
C.MOVE
Single/10TRK/32TRK
Single → 10TRK
C.MOVE ← 32TRK
SELECT
CLR/BAND
C

- **Measuring Equipment & Jigs**

| Adjustment | Measuring equipment&jigs |
|---|---|
| Grating Adjustment | Oscilloscope,clock driver,grating adjustment filter (bandpass filter) (GGF-133), AC millivoltmeter<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| Tangential Skew Check | Oscilloscope,screwdriver<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| Grating Adjustment | Oscilloscope,clock driver,two low-pass filters<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| FE Bias Adjustment | Oscilloscope<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| RF Offset Adjustment | Oscilloscope<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| TE Offset Adjustment-1 | DC voltmeter<br>Extension Cable:GGF1132,GGF1135 |
| Tracking Balance Adjustment-1 | Oscilloscope<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| Focus Servo Loop Gain Adjustment | Oscillator,gain adjustment filter (GGF-065),<br>dual meter milli-voltmeter<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| Tracking Servo Loop Gain Adjustment | Oscillator,gain adjustment filter (GGF-065),<br>dual meter milli-voltmeter<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |
| TE Offset Adjustment-2 | DC voltmeter<br>Extension Cable:GGF1132,GGF1135 |
| Tracking Balance Adjustment-2 | Oscilloscope<br>SONY TYPE 4 (or TYPE 3)<br>Extension Cable:GGF1132,GGF1135 |

## • Adjustment Point




| | |
|---|---|
| VR351 | TRACKING BALANCE |
| VR352 | RF OFFSET |
| VR353 | TE OFFSET |
| VR354 | TRACKING SERVO LOOP GAIN |
| VR355 | FOCUS ERROR BIAS |
| VR356 | FOCUS SERVO LOOP GAIN |

Fig. 17

***Note:***
*CD mechanism module can be adjusted without removing control unit.*

## • Test Point

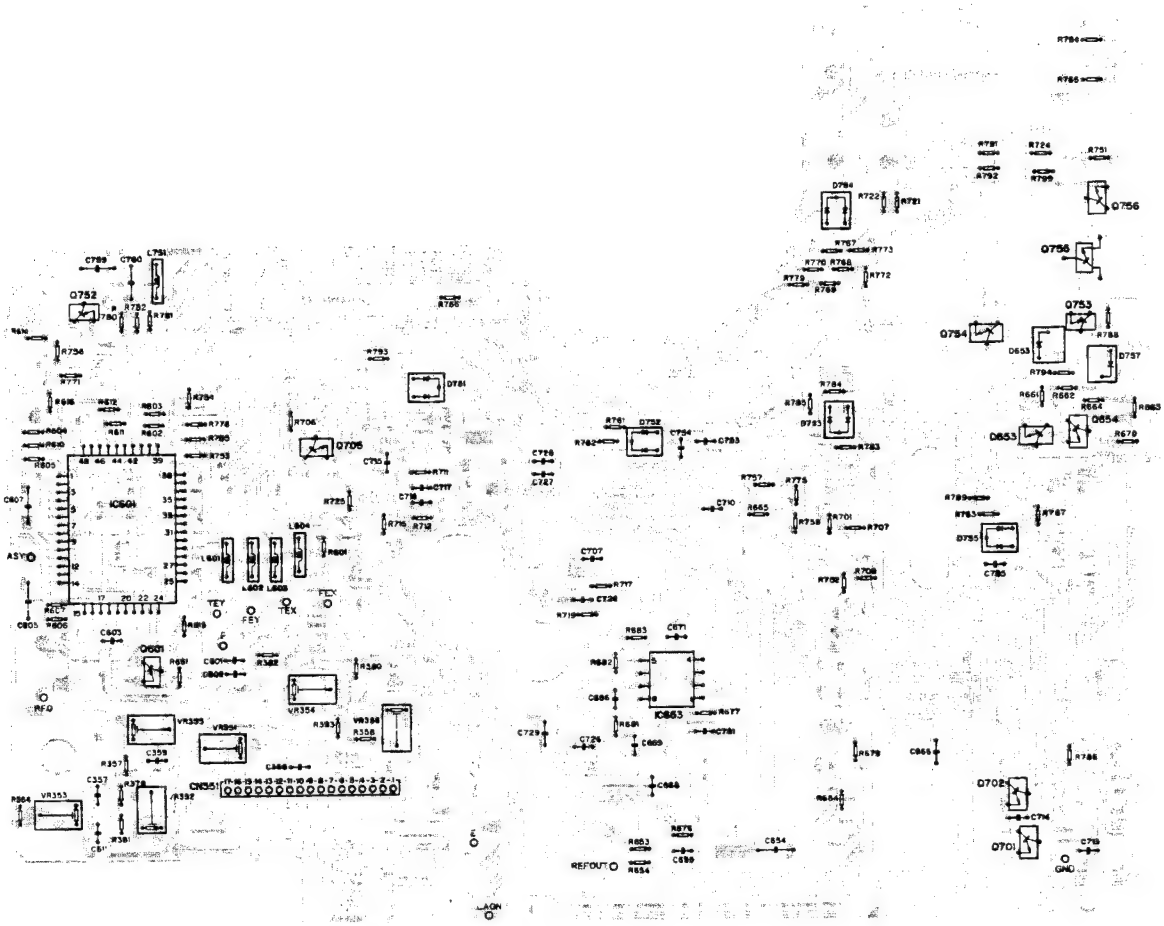


Fig.18

## 10.1 Grating Adjustment (Rough adjustment)

- Purpose: The grating may need adjustment in a replaced pick-up unit.
- Maladjustment symptoms: No disc playback;track jumping.

| | |
|---|---|
| • Measuring equipment / jigs<br>• Measuring point<br>• Test disc and setting<br>• Adjustment position | • Oscilloscope,clock driver,grating adjustment filter (bandpass filter)(GGF-133),AC millivoltmeter<br>• TEY<br>• SONY TYPE 4 (or TYPE 3) • Test mode<br>• Pick-up grating adjustment hole |

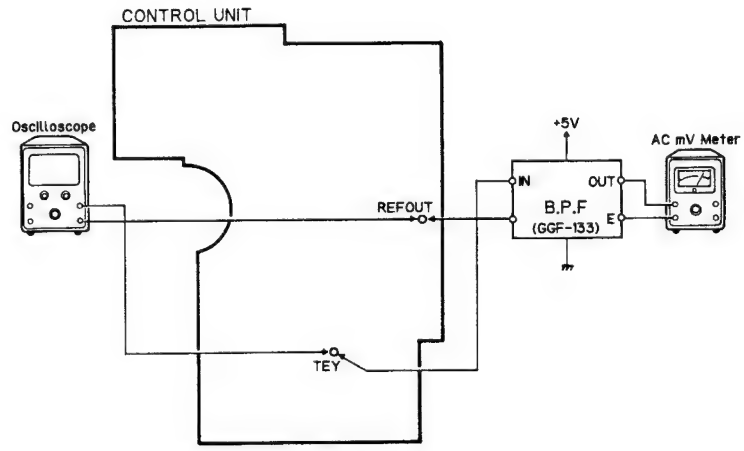
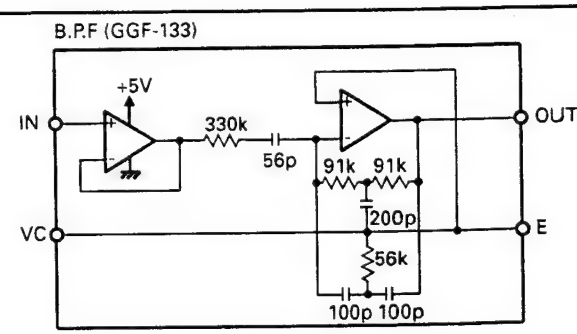



Fig. 19

**Adjustment Procedure**

1. Switch regulator ON in test mode,and load a disc.
2. Use **TRACK+** or **TRACK-** key as required to bring pick-up at the adjusting hole on control unit (tune TNO 6). (TYPE 3:TNO 7)
   Mutch with TNO 6 (TYPE 3:TNO 7) when releweing the control unit.
3. Press the **B** key to close focus.
4. While monitoring the TEY filter output by AC milli-voltmeter,turn the grating adjustment hole slowly. The AC voltage increases and decreases while turning the screw. Search for the minimum voltage level. (This corresponds to the position where the grating is on a track,and is referred to as the null point.)
5. Then while monitoring TEY by oscilloscope,turn the driver slowly clockwise from the null point (as seen from under the pick-up) until the first waveform peak amplitude is reached.



## 10.2 Tangential Skew Check

- Purpose: To check whether tangential skew has been misaligned or not when replacing the pick-up unit.
- Maladjustment symptoms: No disc playback;track jumping.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscilloscope,screwdriver |
| • Measuring point | • RFO |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Normal mode |
| • Adjustment position | • Pick-up tangential adjustment screw |

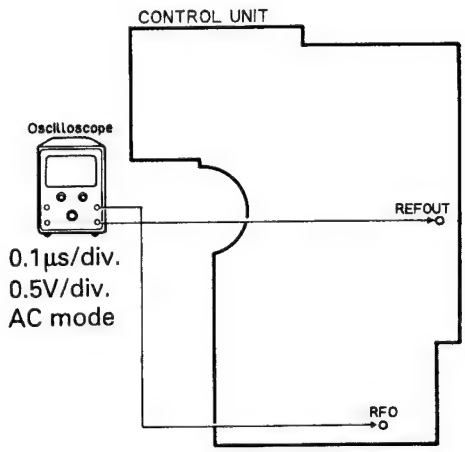
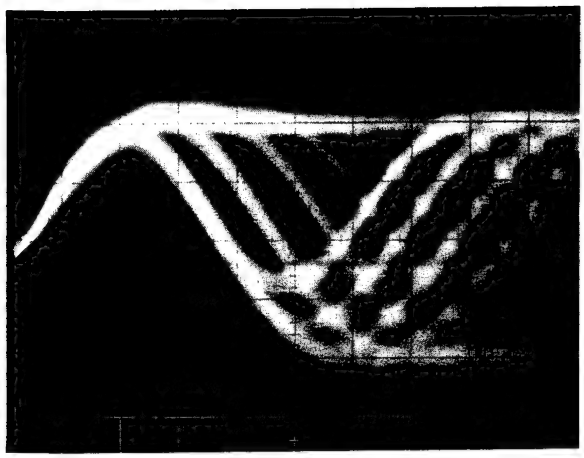



Fig. 20

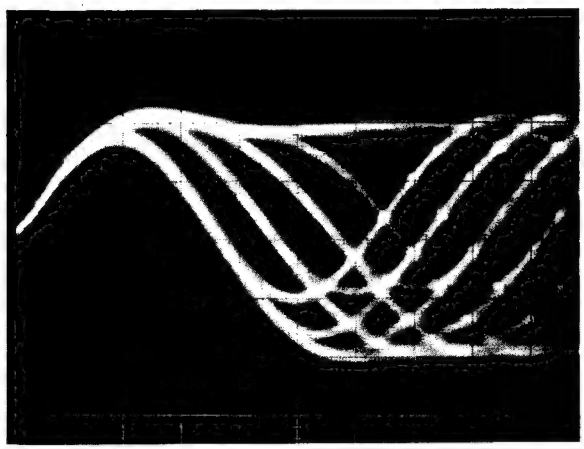
**Adjustment Procedure**

1. Check that the pick up position does not differ from that at the same time of grating adjustment.(TYPE 4:TNO 6,TYPE 3:TNO 7)
2. Turn the tangential adjustment screw to obtain a good RF waveform eye pattern. Turn the adjustment screw both clockwise and counterclockwise to points where the eye pattern deteriorates,and take the midway point as the adjustment point. As a general guide,look for an overall clear waveform,and one of the diamond shapes in the eye pattern. The diamond shapes should appear in fine lines at the point of optimum adjustment. Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.) (See Fig.21,22)
3. Apply "screw-lock" to the tangential adjustment screw.
4. After adjusting tangential skew,also adjust the grating.



NG

Fig. 21



OK

AC Mode
0.5V/div.
0.1µs/div.

Fig. 22

## 10.3 Grating Adjustment (Fine adjustment)

- Purpose: The grating may need adjustment in a replaced pick-up unit.
- Maladjustment symptoms: No disc playback;track jumping.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscilloscope,clock driver,two low-pass filters |
| • Measuring point | • TEY,E LPF output,F LPF output |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Test mode |
| • Adjustment position | • Pick-up grating adjustment hole |

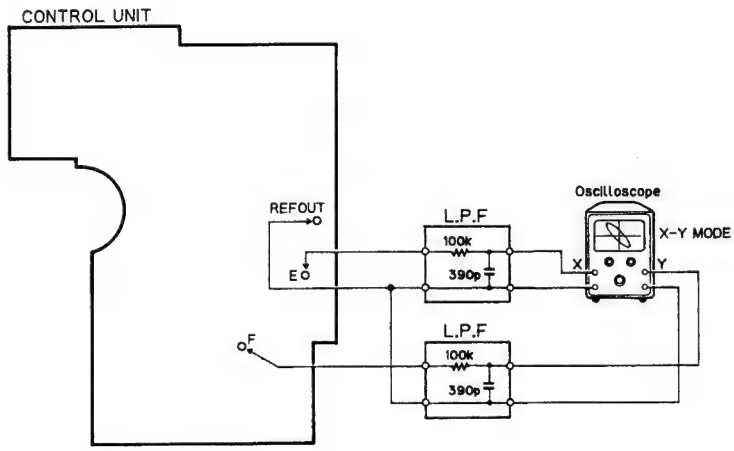



Fig. 23

**Adjustment Procedure**

1. Switch regulator ON in test mode,and load a disc.
2. Use **TRACK+** or **TRACK-** key as required to bring pick-up at the adjusting hole on control unit (tune TNO 6). (TYPE 3:TNO 7)
   Mutch with TNO 6 (TYPE 3:TNO 7) when relewe-ing the control unit.
3. Press the **B** key to close focus.
4. With the E low-pass filter output connected to the X axis of the oscilloscope,and the F low-pass filter output connected to the Y axis,apply an in-put in AC mode and observe the Lissajous fig-urs.(Fig.24-29)
5. Using the driver,adjust the Lissajous figure to a single line (or as close as possible)
6. Switch regulator OFF and remove the filters.

TEY waveform 5ms/div,0.5V/div.

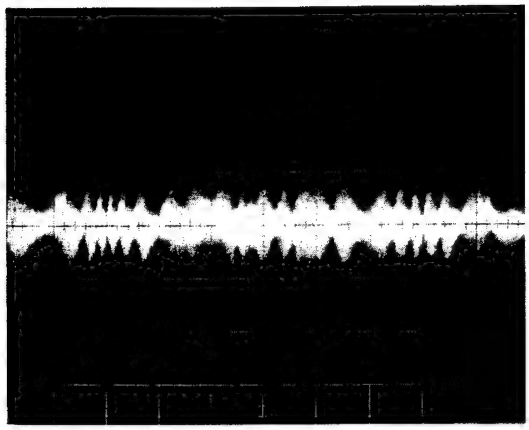


Fig. 24

**Null Point**

Lissajous figure (AC input)
Horizontal axis E 20mV/div.
Vertical axis F 20mV/div.

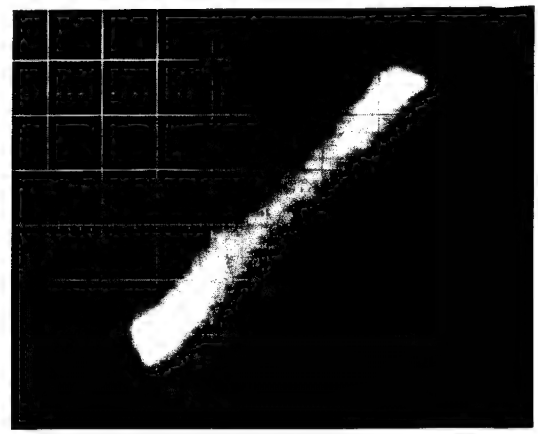


Fig. 25

**"Rough" adjustment**

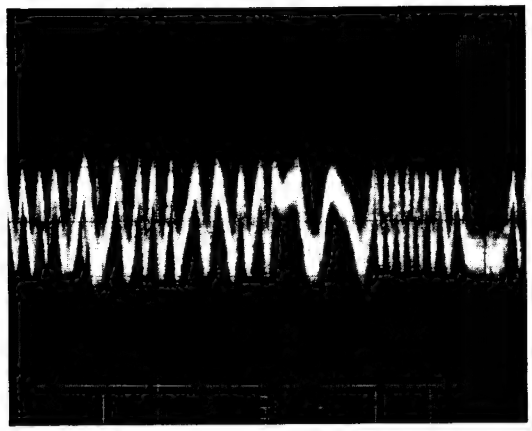


Fig. 26

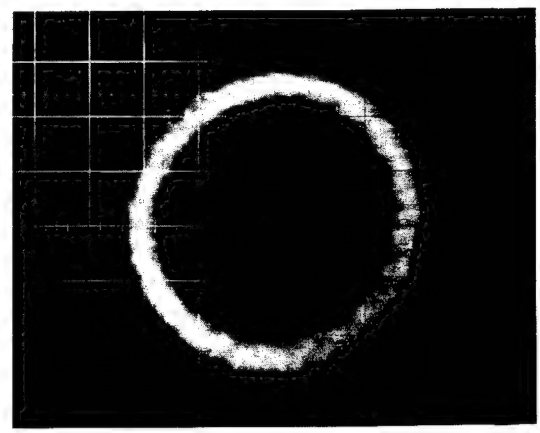


Fig. 27

**Final adjustment**

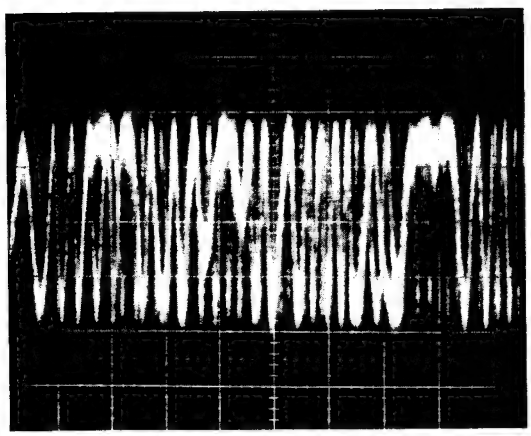


Fig. 28

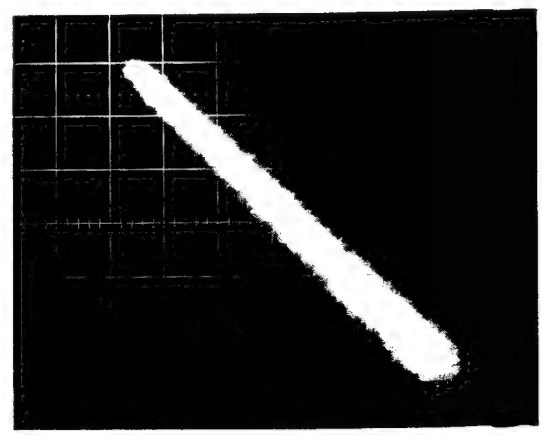


Fig. 29

## 10.4 FE Bias Adjustment

- Purpose: To adjust the focus servo bias to an optimum value.
- Maladjustment symptoms: Focus closing difficulty,poor playability.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscilloscope |
| • Measuring point | • RFO |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Normal mode |
| • Adjustment position | • VR355(FEB) |

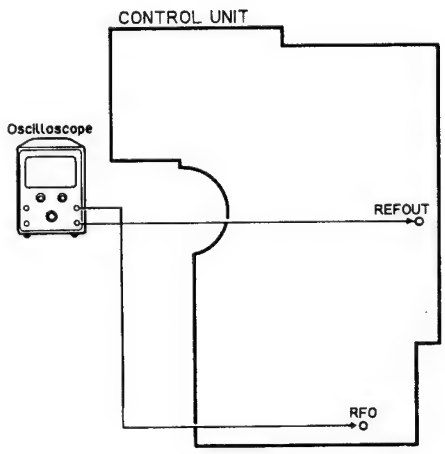
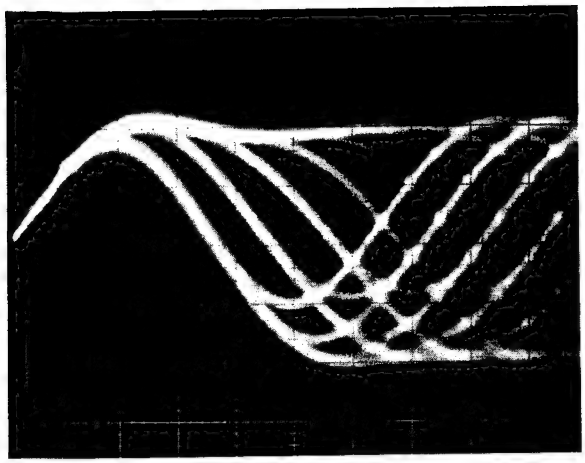



Fig. 30

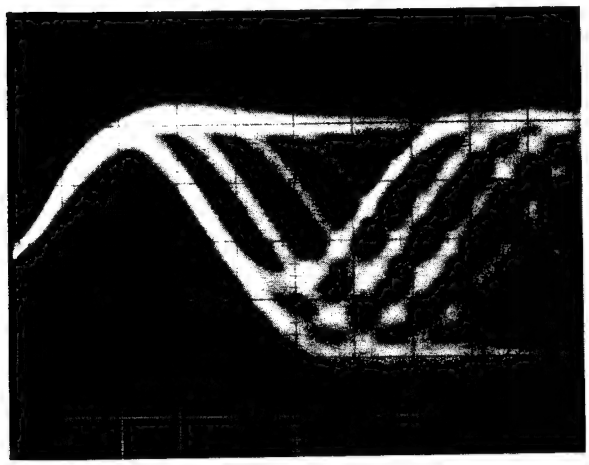
**Adjustment Procedure**

1. Play in normal mode.
2. Observe RFO in respect to REFOUT in the oscilloscope,and adjust VR355(FEB) to obtain maximum RF and optimum eye pattern. (See Fig.31,32)



OK

Fig. 31

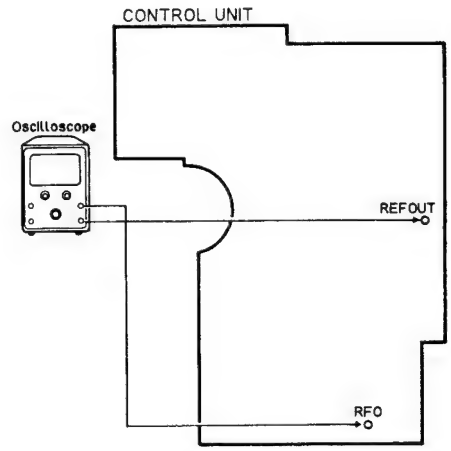


AC Mode Before adjustment Fig. 32

## 10.5 RF Offset Adjustment

- Purpose: To adjust the RF amplifier offset to a suitable value.
- Maladjustment symptoms: Focus closure fails readily.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscilloscope |
| • Measuring point | • RFO |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Normal mode |
| • Adjustment position | • VR352(RFO) |

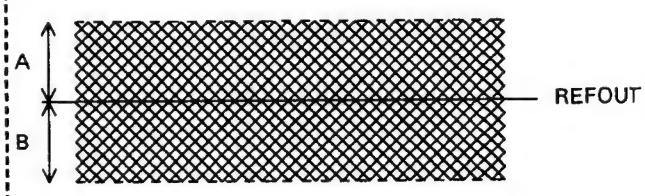



When using a multi-channel oscilloscope,do not connect the other negative probe to ground.

Fig. 33

**Adjustment Procedure**

1. Play tune TNO 12 in normal mode. (TYPE 3:TNO 14)
2. Use VR352 to adjust the RFO waveform so that REFOUT appears at the center. (A-B must not exceed 100 mV.)



## 10.6 TE Offset Adjustment-1

- Purpose: To adjust the electrical offset of the tracking servo to zero.
- Maladjustment symptoms: Search times too long,carriage run-away.

| | |
|---|---|
| • Measuring equipment / jigs | • DC voltmeter |
| • Measuring point | • TEY |
| • Test disc and setting | • No Disc • Test mode |
| • Adjustment position | • VR353(TEO) |

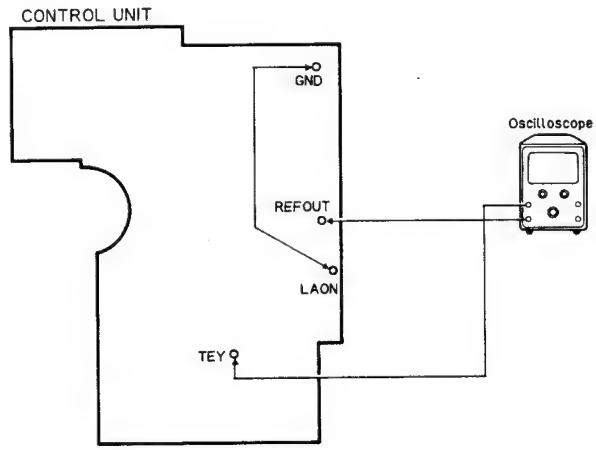



Fig. 34

**Adjustment Procedure**

1. Connect LAON to GND.
2. Switch regulator ON while in test mode.
3. Using VR353(TEO),adjust the TEY output DC voltage in reference to REFOUT to a value of 0±25mV.
4. Switch regulator OFF.

## 10.7 Tracking Balance Adjustment-1

- Purpose: To adjust the tracking servo offset to zero.
- Maladjustment symptoms: Search times too long,poor playability,carriage run-away.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscilloscope |
| • Measuring point | • TEY (Tracking error signal) |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Test mode |
| • Adjustment position | • VR351(T.BAL) |

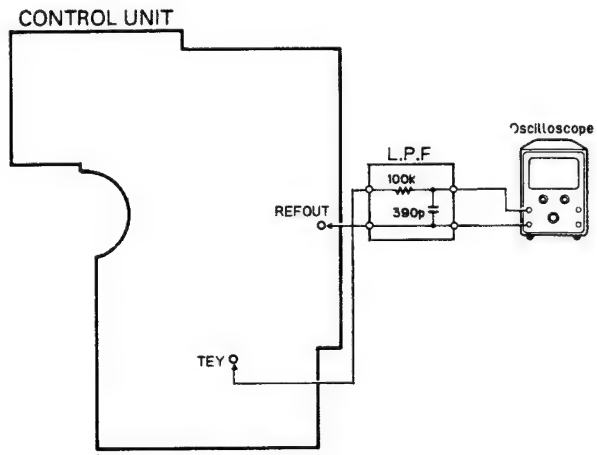
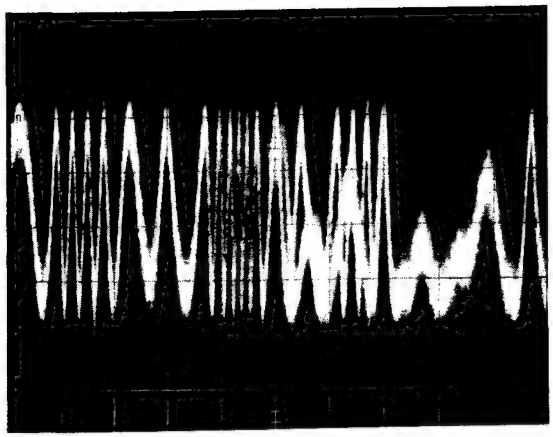



Fig. 35

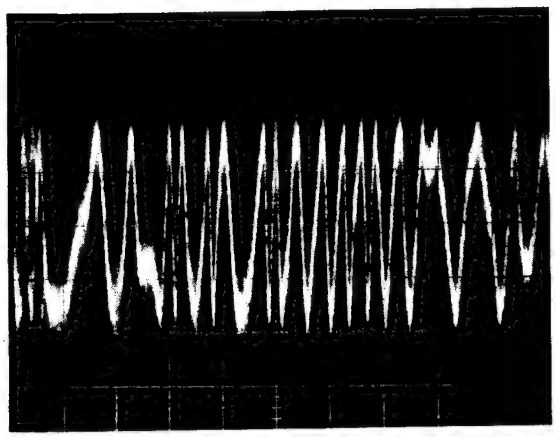
**Adjustment Procedure**

1. Set the test disc (SONY TYPE 4). Switch regulator ON.
2. Using the **TRACK+** or **TRACK-** key,move the pick-up to about the center of the signal surface.
3. Press the **B** key to close focus.
4. Using an oscilloscope,observe the TEY signal in respect to REFOUT.
   Then adjust VR351(T.BAL) to set the positive and negative amplitudes to the same levels.(See Fig.36-38)
5. Switch the power OFF.



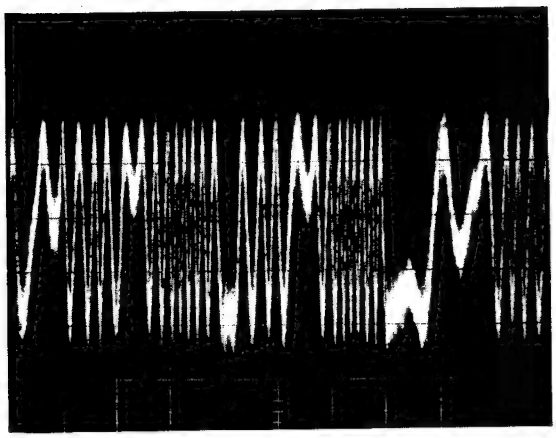
+5% NG

Fig. 36



±0% OK

Fig. 37



−5% NG

Fig. 38

10ms/div.
0.5V/div.
DC Mode

## 10.8 Focus Servo Loop Gain Adjustment

- Purpose: To adjust the focus servo loop gain to an optimum value.
- Maladjustment symptoms: Poor playability,reduced resistance to vibration,focus closure fails readily.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscillator,gain adjustment filter (GGF-065),dual meter milli-voltmeter |
| • Measuring point | • FEX,FEY |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Normal mode |
| • Adjustment position | • VR356(FG) |

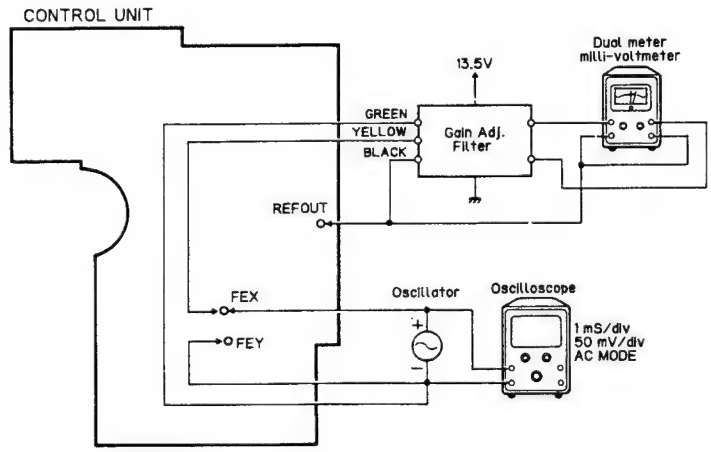



Fig. 39

**Adjustment Procedure**

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3:TNO 14)
3. Set the oscillator to 1kHz,and observe the FEX/FEY output in the oscilloscope. Adjust the oscillator output to obtain a FEX/FEY output of 100mVp-p.
4. Adjust VR356(FG) to obtain a milli-voltmeter difference of 0±0.5dB.

## 10.9 Tracking Servo Loop Gain Adjustment

- Purpose: To adjust the tracking servo loop gain to an optimum value.
- Maladjustment symptoms: Poor playability,reduced resistance to vibration.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscillator,gain adjustment filter (GGF-065),dual meter milli- voltmeter |
| • Measuring point | • TEX,TEY |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Normal mode |
| • Adjustment position | • VR354(TG) |

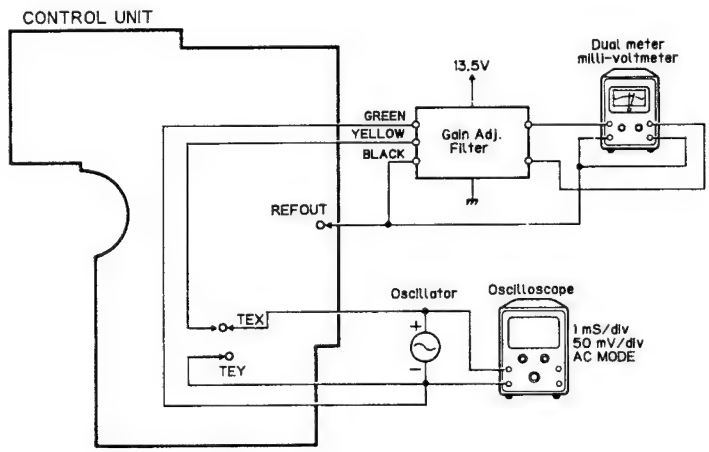



Fig. 40

**Adjustment Procedure**

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3:TNO 14)
3. Set the oscillator to 1.4kHz,and observe the TEX/TEY output in the oscilloscope. Adjust the oscillator output to obtain a TEX/TEY output of 300mVp-p.
4. Adjust VR354(TG) to obtain a milli-voltmeter difference of 0±0.5dB.

## 10.10 TE Offset Adjustment-2

- Purpose: To adjust the electrical offset of the tracking servo to zero.
- Maladjustment symptoms: Search times too long,carriage run-away.

| | |
|---|---|
| • Measuring equipment / jigs | • DC voltmeter |
| • Measuring point | • TEY |
| • Test disc and setting | • No Disc • Test mode |
| • Adjustment position | • VR353 |

**Adjustment Procedure**

Same as for TE offset adjustment-1,but with the DC voltage of the TEY output adjusted to 0±50mV.
The purpose of this additional adjustment is to correct any deviations generated when carrying out the tracking balance and tracking servo loop gain adjustments after completing TE offset adjustment-1.

## 10.11 Tracking Balance Adjustment-2

- Purpose: To adjust the tracking servo offset to zero.
- Maladjustment symptoms: Search times too long,poor playability,carriage run-away.

| | |
|---|---|
| • Measuring equipment / jigs | • Oscilloscope |
| • Measuring point | • TEY |
| • Test disc and setting | • SONY TYPE 4 (or TYPE 3) • Test mode |
| • Adjustment position | • VR351 |

**Adjustment Procedure**

Steps 1 thru 5 same as tracking balance adjustment-1.

6. Check that the level difference between the positive and negative amplitudes of the TEY signal is within 5% (See Fig.36-38). If greater than 5%,adjust with VR351.
7. If further adjustment was necessary in step 6,repeat TE offset adjustment-2.

## 10.12 TUNER ADJUSTMENT

### • Connection Diagram

**NOTICE:** Select C1 so that total capacity of 80pF attained from the direction of the receiver jack.
Z: Output impedance of SSG.

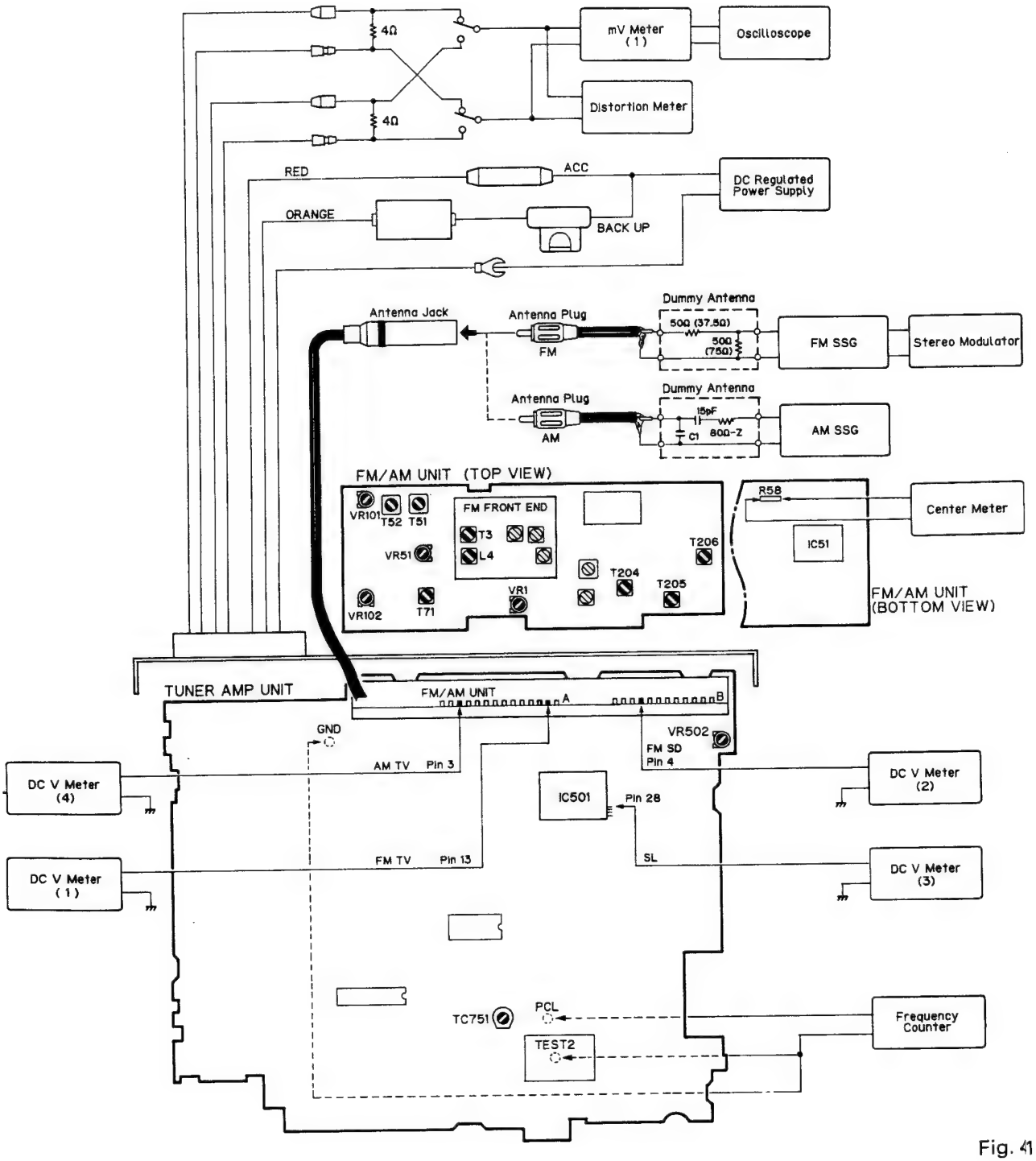



Fig. 41

## FM ADJUSTMENT

※ Stereo MOD.: 1kHz, L+R=90% , Pilot=10%
*( ):US, UC Model

| | No. | FM SSG(400Hz, 100%) | | Displayed Frequency (MHz) | Adjusting Point | Adjustment Method (Switch Position) |
|---|---|---|---|---|---|---|
| | | Frequency (MHz) | Level (dBf) | | | |
| Front End | 1 | | | 108.0 *(107.9) | L4 | DC V Meter(1):7.3±0.2V |
| | 2 | | | 87.5 *(87.9) | —— | Verify that DC V Meter(1) is more than 1.4±0.6V. |
| | 3 | 98.1 | 10 | 98.1 | T3 | mV Meter(1):Maximum |
| IF | 1 | 98.1025 | 65 | 98.1 | T51 | Center Meter:0 |
| | 2 | 98.1 | 65 | 98.1 | T52 | Distortion Meter:Minimum |
| | 3 | Repeat No.1-2 alternately so that the center meter indicates the 0 output and distortion meter indicates the minimum output. | | | | |
| | 4 | 98.1 | 13 | 98.1 | T71 | Oscilloscope :Optimum Symmetry |
| | 5 | ※98.1 | 65 | 98.1 | T71 | Distortion Meter:Minimum (Rotate T71 less than ±90° ) |
| Soft Mute | 1 | 98.1 | 65 | 98.1 | — | mV Meter(1): A dB (FM STEREO MODE) |
| | 2 | 98.1 | 14 | 98.1 | VR102 | mV Meter(1): A-3 dB (FM STEREO MODE) |
| ARC | 1 | ※98.1 | 39 | 98.1 | VR101 | mV Meter(1):Separation 5 dB (FM STEREO MODE) |
| SD | 1 | 98.1 | 20 | 98.1 | VR51 | DC V Meter(2):Approx. 5V |
| | 2 | 98.1 | 19 | 98.1 | — | Verify that DC V Meter (2)is approx. 0V |
| | 3 | 98.1 | 60 | 98.1 | VR1 | DC V Meter(2):Approx. 5V |
| | 4 | 98.1 | 59 | 98.1 | — | Verify that DC V Meter (2)is approx. 0V |
| RDS *1 | 1 | 98.1 | 35 | 98.1 | VR502 | DC V Meter(3):1.2±0.05V |

*1:DEH-M980RDS/EW only

## MW/LW ADJUSTMENT (EW model)

| | No. | AM SSG(400Hz, 30% ) | | Displayed Frequency (kHz) | Adjusting Point | Adjustment Method (Switch Position) |
|---|---|---|---|---|---|---|
| | | Frequency (kHz) | Level (dBμV) | | | |
| Tuning Volt | 1 | — | — | 153 | — | Verify that DC V Meter (4) is more than 2.0V. |
| | 2 | — | — | 1,602 | — | Verify that DC V Meter (4) is less than 6.5V. |
| | 3 | 999 | 25 | 999 | T204, 205, 206 | mV Meter(1):Maximum |

## AM ADJUSTMENT (US, UC, ES model)

*( ):ES model when tuning step at 9kHz.

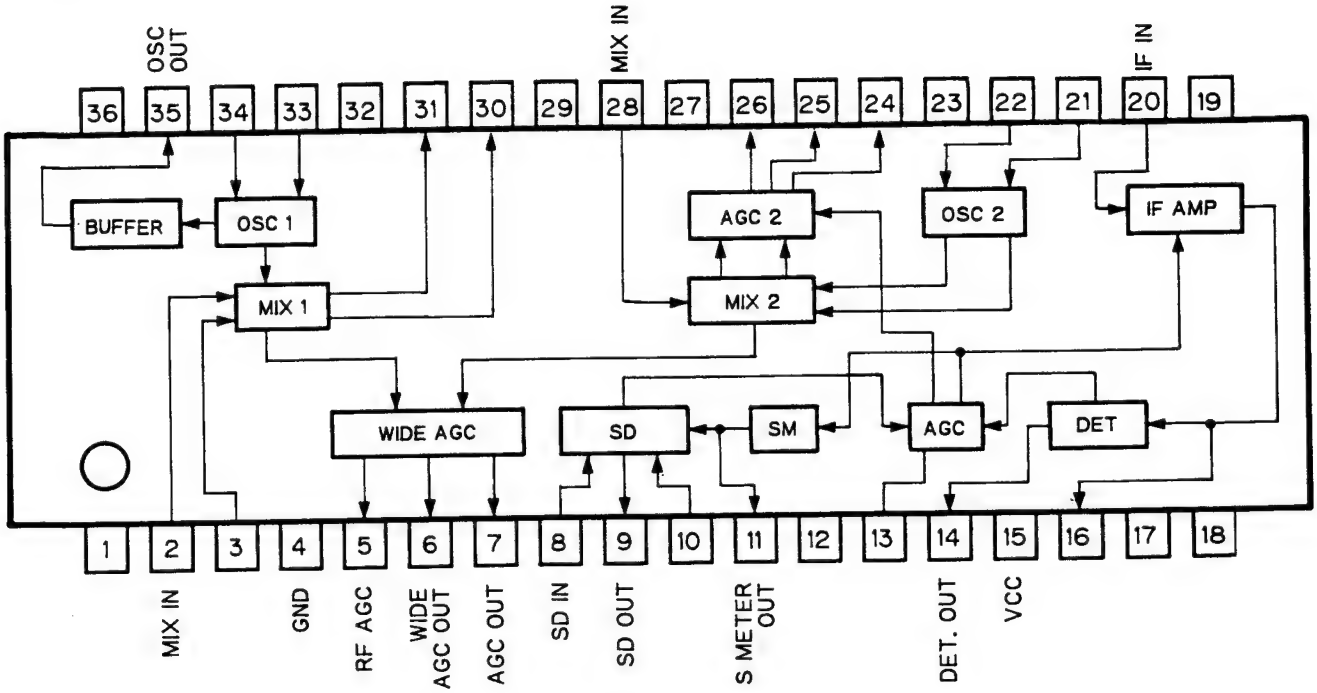
| | No. | AM SSG(400Hz, 30% ) | | Displayed Frequency (kHz) | Adjusting Point | Adjustment Method (Switch Position) |
|---|---|---|---|---|---|---|
| | | Frequency (kHz) | Level (dBμV) | | | |
| Tuning Volt | 1 | | | 1,710 *(1,602) | — | Verify that DC V Meter (4) is less than 6.5V. |
| | 2 | | | 530 *(531) | — | Verify that DC V Meter (4) is more than 2.0V. |
| IF | 1 | 1,000 (999) | 15 | 1,000 (999) | T204, 205, 206 | mV Meter(1):Maximum |

## CLOCK ADJUSTMENT

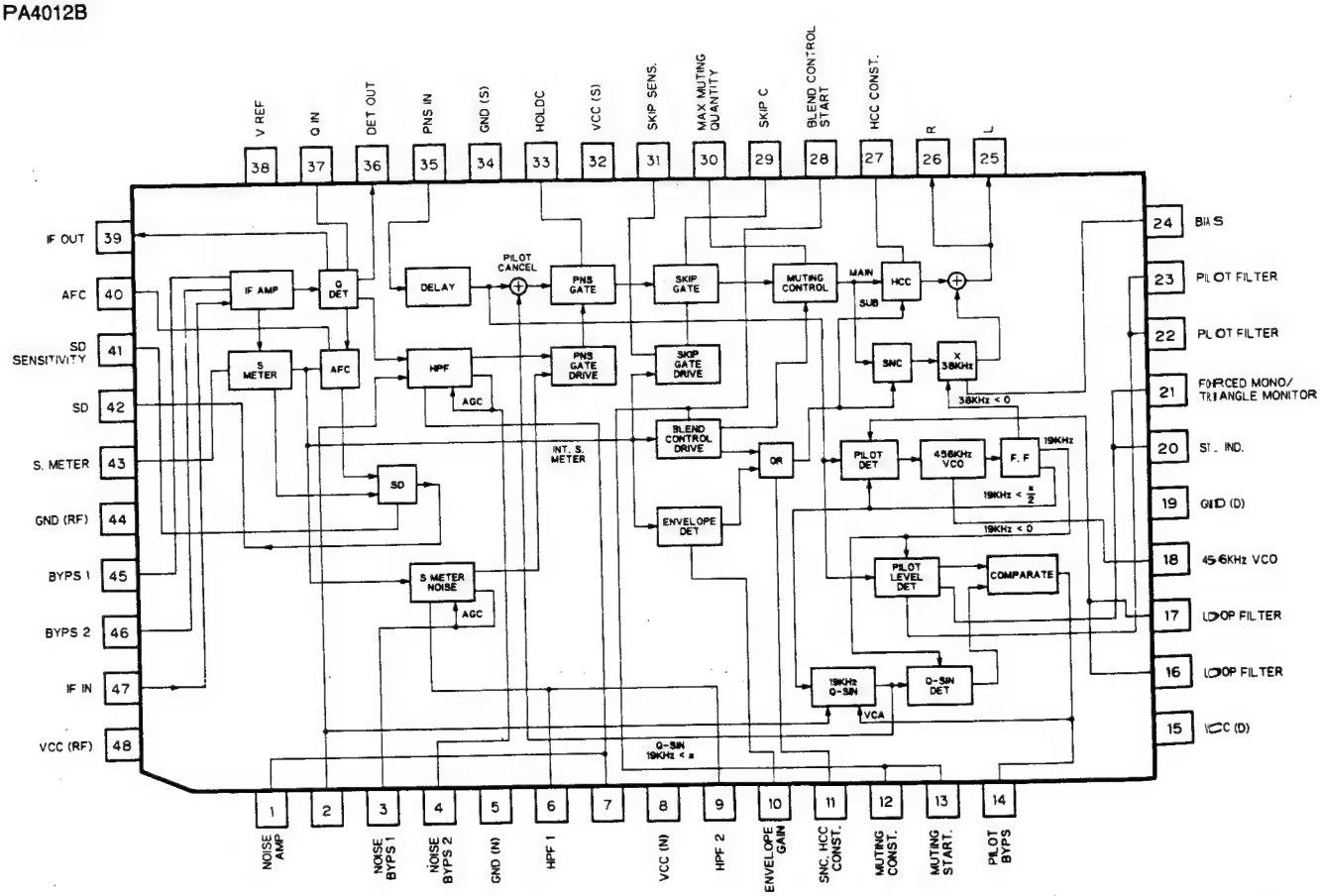
| No. | Adjusting Point | Adjustment Method (Switch Position) |
|---|---|---|
| 1 | | TEST2 connect to GND |
| 2 | TC751 | Frequency Counter : 1.048576MHz±2Hz |

## • ICs

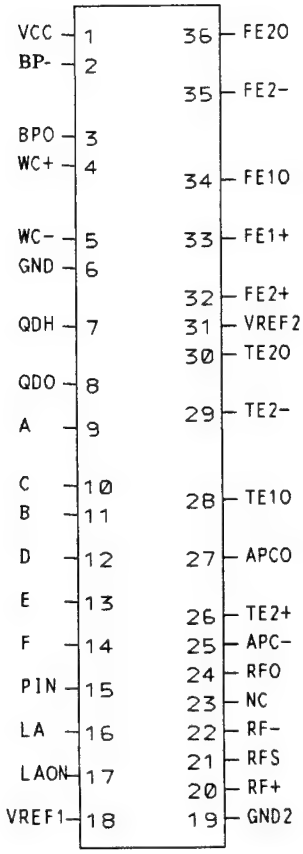
PA4018




PA4012B



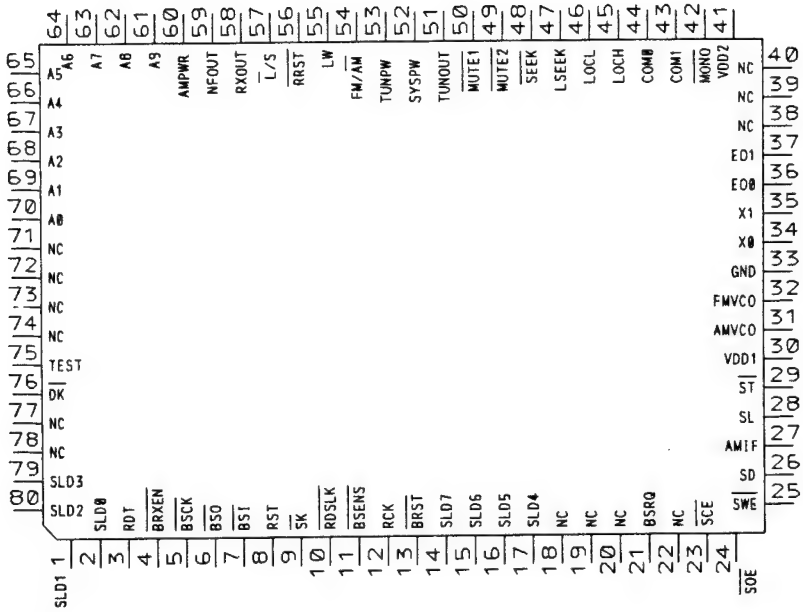
UPC1347GS




● Pin Functions(UPC1347GS)

| Pin No | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1 | VCC | | |
| 2 | BP- | Input | Vibration detect amplifier 1 inverter input |
| 3 | BPO | Output | Vibration detect amplifier 1 output |
| 4 | WC+ | Input | Window comparator non-inverting input |
| 5 | WC- | Input | Window comparator inverter input |
| 6 | GND | | GND |
| 7 | QDH | Input | Vibration detect amplifier 3 non-inverting input |
| 8 | QDO | Output | Vibration detect amplifier 3 output |
| 9 | A | Input | A signal input |
| 10 | C | Input | C signal input |
| 11 | B | Input | B signal input |
| 12 | D | Input | D signal input |
| 13 | E | Input | E signal input |
| 14 | F | Input | F signal input |
| 15 | PIN | Input | APC circuit PD amplifier input |
| 16 | LA | Output | APC circuit LD amplifier output |
| 17 | LAON | | Laser diode ON/OFF switching |
| 18 | VREF1 | | Reference voltage |
| 19 | GND2 | | GND |
| 20 | RF+ | Input | RF amplifier non-inverting input |
| 21 | RFS | Output | RF summing virtual output |
| 22 | RF- | Input | RF amplifier inverter input |
| 23 | NC | | |
| 24 | RFO | Output | RF amplifier output |
| 25 | APC- | Input | APC circuit PD amplifier inverter input |
| 26 | TE2+ | Input | Tracking error amplifier 2 non-inverting input |
| 27 | APCO | Output | APC circuit PD amplifier output |
| 28 | TE1O | Output | Tracking error amplifier 1 output |
| 29 | TE2- | Input | Tracking error amplifier 2 inverter input |
| 30 | TE2O | Output | Tracking error amplifier 2 output |
| 31 | VREF2 | | Reference voltage |
| 32 | FE2+ | Input | Focus error amplifier 2 non-inverting input |
| 33 | FE1+ | Input | Focus error amplifier 1 non-inverting input |
| 34 | FE1O | Output | Focus error amplifier 1 output |
| 35 | FE2- | Input | Focus error amplifier 2 inverter input |
| 36 | FE2O | Output | Focus error amplifier 2 output |

*GGF-919




*IC's marked by * are MOS type.*
*Be careful handing them because they are very liable to be damaged by electrostatic induction.*

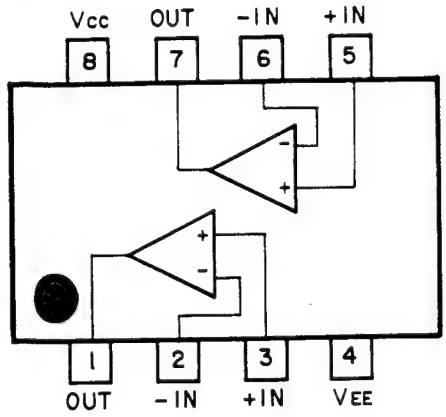
## • Pin Functions (GGF-919)

| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 1, 2 | SLD1, SLD0 | I/O | | SRAM data input/output pin |
| 3 | RDT | Input | N | Error correction data input pin |
| 4 | $\overline{\text{BRXEN}}$ | I/O | N | Busy input pin |
| 5 | $\overline{\text{BSCK}}$ | I/O | | Serial clock input pin |
| 6 | $\overline{\text{BSO}}$ | Input | | Serial data Input pin |
| 7 | $\overline{\text{BSI}}$ | Input | | Serial data input pin |
| 8 | RST | Input | | Data start input pin |
| 9 | $\overline{\text{SK}}$ | Input | | SK signal input pin |
| 10 | $\overline{\text{RDSLK}}$ | Input | | RDS signal lock input pin |
| 11 | $\overline{\text{BSENS}}$ | Input | | Back up power sense input pin |
| 12 | RCK | Input | | Data clock input pin |
| 13 | $\overline{\text{BRST}}$ | Input | | Bus communication reset input pin |
| 14 – 17 | SLD7 – SLD4 | I/O | C | SRAM data input/output pin |
| 18 – 20 | NC | | | Not used |
| 21 | BSRQ | Output | C | Bus communication service request output pin |
| 22 | NC | | | Not used |
| 23 | $\overline{\text{SCE}}$ | Output | C | SRAM chip enable output pin |
| 24 | $\overline{\text{SOE}}$ | Output | C | SRAM output enable output pin |
| 25 | $\overline{\text{SWE}}$ | Output | C | SRAM read/write output pin "H":read, "L":write |
| 26 | SD | Input | | SD signal input pin |
| 27 | AMIF | Input | | AM IF input pin |
| 28 | SL | Input | | Signal level input pin |
| 29 | $\overline{\text{ST}}$ | Input | | Stereo broadcast detection signal input pin |
| 30 | VDD1 | | | Device power supply terminal |
| 31 | AMVCO | Input | | AM VCO signal input pin |
| 32 | FMVCO | Input | | FM VCO signal input pin |
| 33 | GND | | | GND |
| 34 | XO | Output | | Crystal oscillating element connection pin |

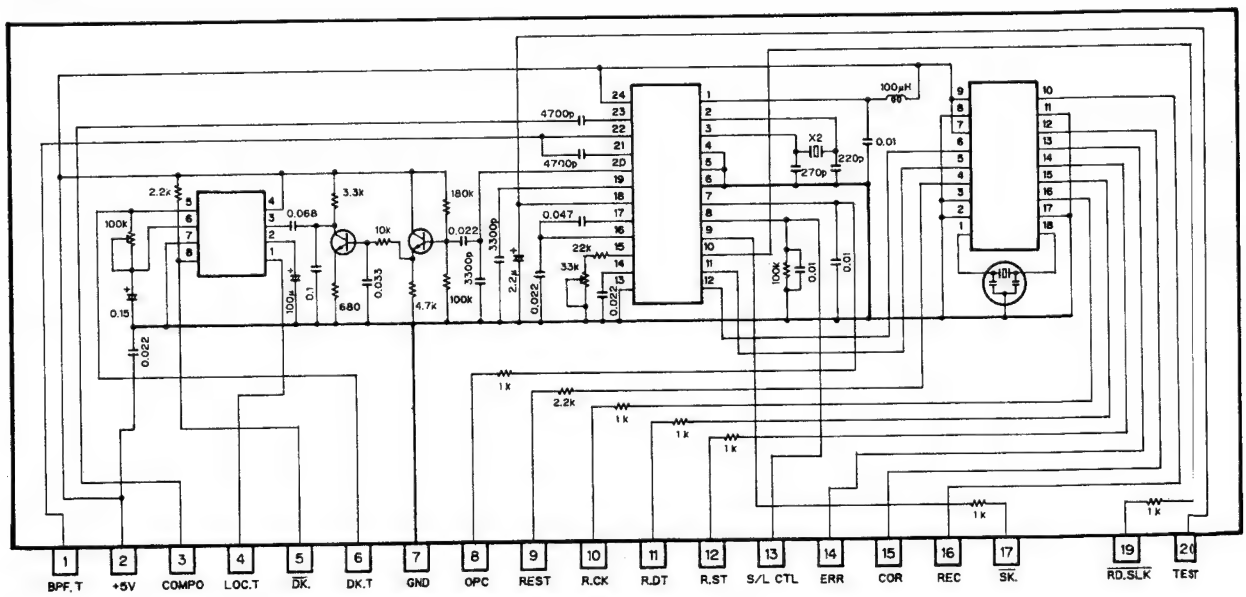
| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 35 | XI | Input | | Crystal oscillating element connection pin |
| 36 | E00 | Output | C | PLL error output 0 pin |
| 37 | E01 | Output | C | PLL error output 1 pin |
| 38 – 40 | NC | | | Not used |
| 41 | VDD2 | | | Device power supply pin |
| 42 | $\overline{\text{MONO}}$ | Output | C | Forced mono output pin |
| 43, 44 | NC | | | Not used |
| 45 | LOCH | Output | C | Local H setup output pin |
| 46 | LOCL | Output | C | Local L setup output pin |
| 47 | LSEEK | Output | C | Outputs high signal during BSM local SEEK operation. |
| 48 | $\overline{\text{SEEK}}$ | Output | C | SEEK output pin<br>Outputs low signal during SEEK operation. |
| 49 | $\overline{\text{MUTE2}}$ | Output | C | Mute output when tuner/CD multi switching |
| 50 | $\overline{\text{MUTE1}}$ | Output | C | Tuner mute output pin |
| 51 | TUNOUT | Output | C | Tuner/CD multi audio signal switching control pin<br>"H":Tuner, "L":CD multi |
| 52 | SYSPW | Output | C | System power output pin |
| 53 | TUNPW | Output | C | Tuner power output pin |
| 54 | FM/$\overline{\text{AM}}$ | Output | C | FM/AM power select output pin "H":FM, "L":AM |
| 55 | LW | Output | C | Loop filter switching output pin "H":LW |
| 56 | $\overline{\text{RRST}}$ | Output | C | RDS data reset output pin |
| 57 | $\overline{\text{L}}$/S | Output | C | RDS decoder time constant select output pin |
| 58 | RXOUT | Output | C | RX output pin |
| 59 | NFOUT | Output | C | NF output pin |
| 60 | AMPWR | Output | C | "H" output when AM |
| 61 – 70 | A9 – A0 | Output | C | SRAM address output pin |
| 71 – 74 | NC | | | Not used |
| 75 | TEST | Input | RDW | TEST mode input pin |
| 76 | $\overline{\text{DK}}$ | Input | RDW | DK signal input pin |
| 77, 78 | NC | | | Not used |
| 79, 80 | SLD3, SLD2 | I/O | C | SRAM data input/output pin |

| I/O Format | Meaning |
|---|---|
| C | CMOS Output |
| N | N channel open drain |
| RDW | With pull down resistor |

M5218FP
RC4558M




CWV1020

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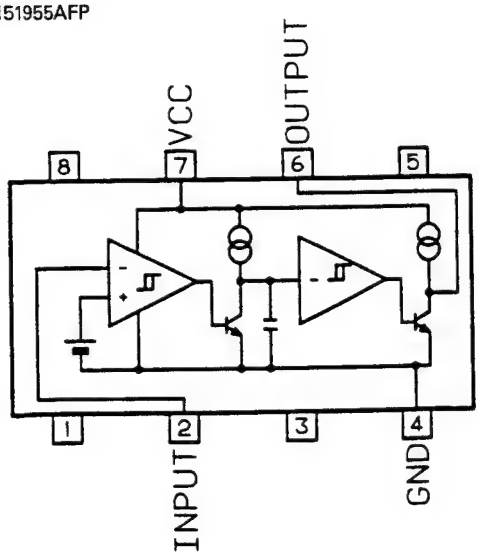
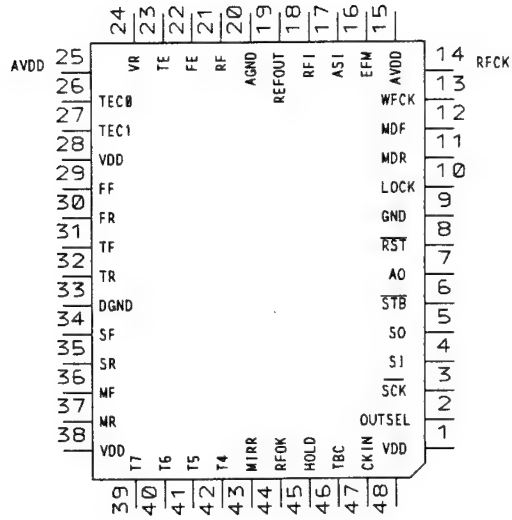


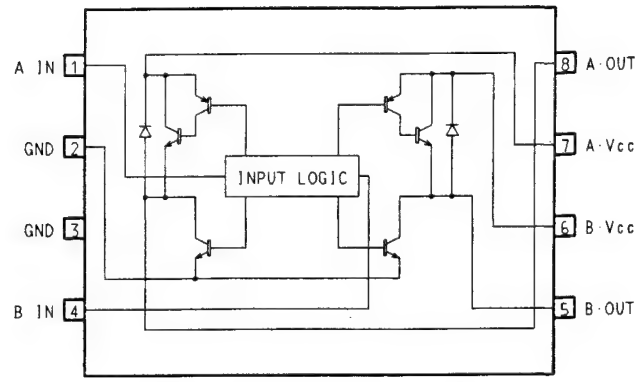
## • Pin Functions (UPD6374GH)

| Pin No | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1 | VDD | | Positive power supply terminal for logic circuit |
| 2 | OUTSEL | Input | Sets PWM output mode for the motor system |
| 3 | $\overline{SCK}$ | Input | Clock input terminal for serial date input and output |
| 4 | SI | Input | Serial date input |
| 5 | SO | Output | serial date and status signal output |
| 6 | $\overline{STB}$ | Input | Signal latching serial data inside LSI |
| 7 | A0 | Input | Used in combination with $\overline{STB}$<br>A0 = "L" : Set in address register when $\overline{STB}$ is active<br>A0 = "H" : Parameter setting when $\overline{STB}$ is active |
| 8 | $\overline{RST}$ | Input | System reset |
| 9 | DGND | | Logic circuit GND |
| 10 | LOCK | Input | Input terminals for detection of spindle servo error signals |
| 11 | MDR | Input | |
| 12 | MDF | Input | |
| 13 | WFCK | Input | |
| 14 | RFCK | Input | |
| 15 | AVDD | | Positive power supply terminal for analog circuit |
| 16 | EFM | Output | EFM signal output terminal |
| 17 | ASI | Input | Level comparing input terminal for RF signal comparison |
| 18 | RFI | Input | Analog input terminal for EFM comparator |
| 19 | REFOUT | Output | A/D converter midpoint output terminal inside LSI |
| 20 | AGND | | Analog circuit GND |
| 21 | RF | Output | RF signal input terminal |
| 22 | FE | Input | Focus error input terminal |
| 23 | TE | Input | Tracking error input terminal |
| 24 | VR | Input | Input signal is quantified as follows : Fs=88.2KHz, Resolution : 6 bits The output takes place directly at microcomputer interface, that is, not via the filter block within LSI. |
| 25 | AVDD | | Positive power supply terminal for analog circuit |
| 26 | TECO | Input | Tracking comparator input terminal |
| 27 | TECI | Input | |
| 28 | DVDD | | Positive power supply terminal for logic circuit |
| 29 | FF | Output | PWM positive output terminal for the focus loop filter |
| 30 | FR | Output | PWM negative output terminal for the focus loop filter |
| 31 | TF | Output | PWM positive output terminal for the tracking loop filter |
| 32 | TR | Output | PWM negative output terminal for the tracking loop filter |
| 33 | DGND | | Logic circuit GND terminal |
| 34 | SF | Output | PWM positive output terminal for the thread loop filter |
| 35 | SR | Output | PWM negative output terminal for the thread loop filter |
| 36 | MF | Output | PWM positive output terminal for the spindle loop filter |
| 37 | MR | Output | PWM negative output terminal for the spindle loop filter |
| 38 | DVDD | | Positive power supply terminal for logic circuit |
| 39 | T7 | Input | Sets tracking PWM output mode |
| 40 | T6 | Input | Sets focus PWM output mode |
| 41 | T5 | Input | Selects motor modulation mode |
| 42 | T4 | Input | Selects between focus and tracking modulation modes |
| 43 | MIRR | Output | MIRR detection signal output terminal |
| 44 | RFOK | Output | RFOK detection signal output terminal |
| 45 | HOLD | Input | Hold control signal input terminal |
| 46 | TBC | | Tracking bank switching terminal |
| 47 | CKIN | Input | System clock input terminal |
| 48 | $\overline{TEST}$ | Input | Test terminal |

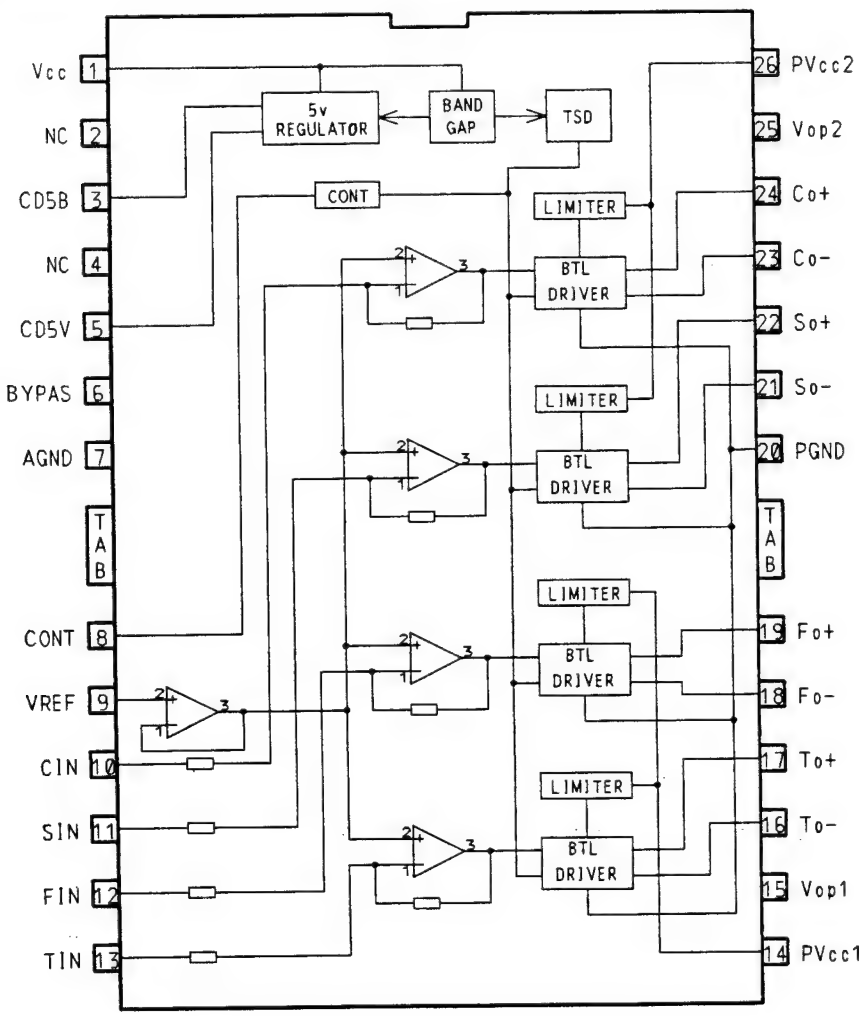
UPD6374GH




MB3854PF




PA3026

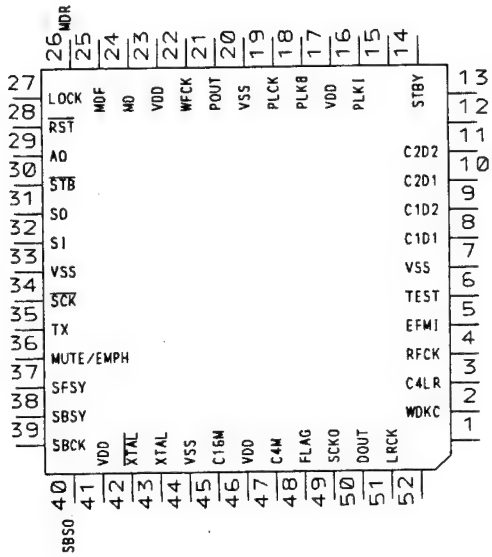


## • Pin Functions (UPD6375GC)

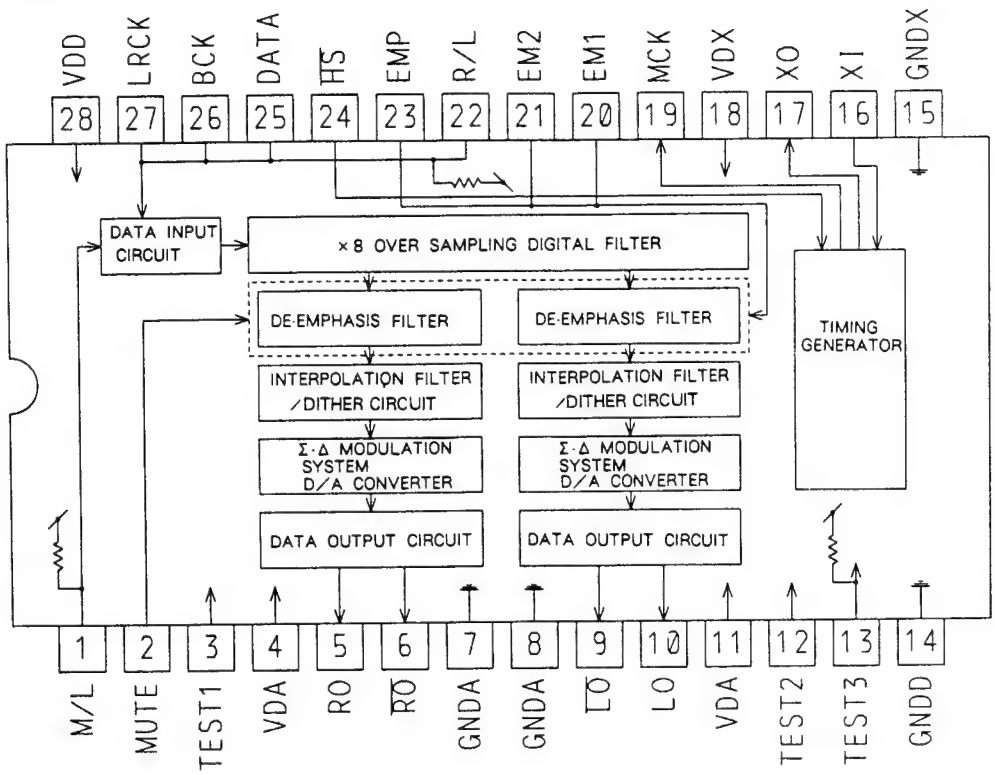
| Pin No | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1 | NC | | |
| 2 | WDCK | Output | Output terminal for signal having double the frequency of LRCK |
| 3 | C4LR | Output | Output terminal for signal having four the frequency of LRCK |
| 4 | RFCK | Output | Oscillation clock divider signal, output terminal for signal giving one-frame synchronization |
| 5 | EFMI | Input | EFM signal input terminal |
| 6 | TEST | | TEST |
| 7 | VSS | | GND |
| 8 | C1D1 | Output | Output terminal indicating C1 error correction status |
| 9 | C1D2 | Output | |
| 10 | C2D1 | Output | Output terminal indicating C2 error correction status |
| 11 | C2D2 | Output | |
| 12, 13 | NC | | |
| 14 | STBY | Input | Standby input terminal. STBY=H stops clock oscillation |
| 15 | NC | | |
| 16 | PLK1 | Output | VCO output terminal for use in analog PLL selection |
| 17 | VDD | | VDD |
| 18 | PLK8 | Input | VCO clock input terminal for use in analog PLL selection |
| 19 | PLCK | Output | Bit clock monitor terminal |
| 20 | VSS | | GND |
| 21 | POUT | Output | Output terminal for phase comparison between EFM signal and bit clock |
| 22 | WFCK | Output | Signal issuring one-frame period (approximately 7.35kHz) by bit clock dividing signal |
| 23 | VDD | | 5 V |
| 24 | MD | Output | Signal indicating spindle motor CLV servo control output status |
| 25 | MDF | Output | Spindle motor CLV servo control positive direction output terminal |
| 26 | MDR | Output | Spindle motor CLV servo control negative direction output terminal |
| 27 | LOCK | Output | Becomes "H" when the synchronization signal and frame counter output coincide at EFM demodulator |
| 28 | $\overline{RST}$ | Input | Reset signal input terminal |
| 29 | A0 | Input | Control signal distinguishing data from microcomputer |
| 30 | $\overline{STB}$ | Input | Signal latching within this LSI the serial data fetched from SI terminal |
| 31 | SO | | Serial data input terminal |
| 32 | SI | Input | Input terminal fro data from microcomputer |
| 33 | VSS | | GND |
| 34 | $\overline{SCK}$ | Input | Clock input terminal for serial data input |
| 35 | TX | Output | Digital audio interface data output terminal |
| 36 | MUTE/EMPH | Output | Output terminal for mute command decoding signal or sub-Q command pre-emphasis data |
| 37 | SFSY | Output | Signal indicating subcode one-frame synchronization |
| 38 | SBSY | Output | Signal indicating head of subcode block |
| 39 | SBCK | Input | Subcode data read clock input terminal |
| 40 | SBSO | Output | Subcode data output terminal |
| 41 | VDD | | 5 V |
| 42 | $\overline{XTAL}$ | Output | Oscillation continuation terminal |
| 43 | XTAL | Input | Oscillation continuation terminal |

| Pin No | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 44 | VSS | | GND |
| 45 | C16M | Output | Oscillation clock output terminal |
| 46 | VDD | | 5 V |
| 47 | C4M | Output | 1/4 cycle output terminal for oscillation clock signals |
| 48 | FLAG | Output | Flag signal indicating that the current audio data output consists of incorrectable data |
| 49 | SCKO | Output | Clock output terminal for audio serial data |
| 50 | DOUT | Output | Serial audio data output terminal |
| 51 | LRCK | Output | Signal distinguishing between left and right channel DOUT terminal output |
| 52 | NC | | |

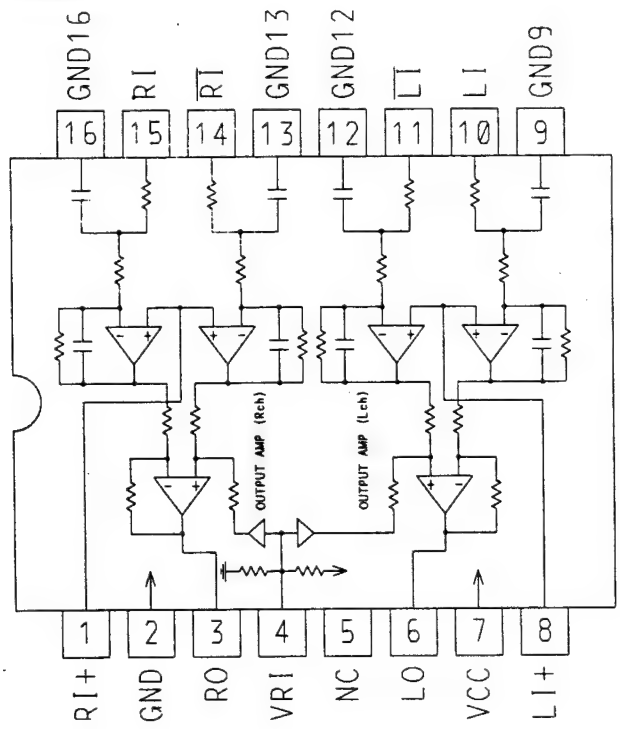
UPD6375GC



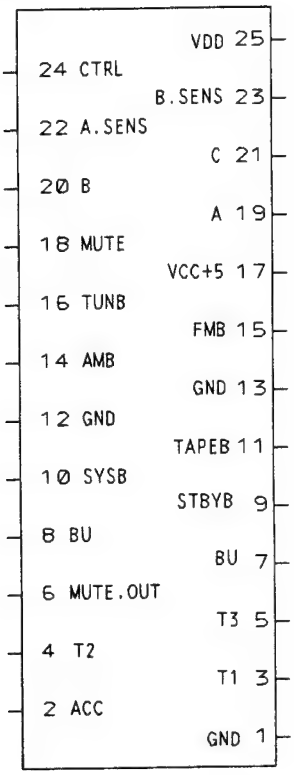
TC9237F




TA2009F



PA2019A




## • Pin Function (PA2019A)

| Pin No. | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1 | GND(REF) | | Reference ground |
| 2 | ACC | | ACC |
| 3 | T1 | | Connects external condenser for VDD back-up |
| 4, 5 | NC | | |
| 6 | MUTEOUT | Output | Mute circuit control output |
| 7, 8 | BU | | Back-up |
| 9 | STBY B | Output | Power amplifier control signal output |
| 10 | SYSB | Output | Stabilized power output for common system circuits such as for tone quality , volume , and balance |
| 11 | TAPEB | Output | Stabilized power output for cassette deck circuits such as for the equalizer amplifier |
| 12, 13 | GND(A) | | Analog ground |
| 14 | AMB | Output | Stabilized power output for AM tuner circuit |
| 15 | FMB | Output | Stabilized power output for FM tuner circuit |
| 16 | TUNB | Output | Stabilized power output for AM and FM tuner external circuit |
| 17 | VCC 5V | Output | Stabilized power output for microcomputer interface and other circuit |
| 18 | MUTE | Input | Mute signal input |
| 19 | A | Input | Output selection input controlling output by the 3-bit ABC signal |
| 20 | B | Input | Output selection input controlling output by the 3-bit ABC signal |
| 21 | C | Input | Output selection input controlling output by the 3-bit ABC signal |
| 22 | ASENS | Output | ACC line voltage detection output(H for output detection) |
| 23 | BSENS | Output | BU line voltage detection output(H for output detection) |
| 24 | CTRL | Input | IC status control input for control from outside |
| 25 | VDD 5V | | Stabilized power source for microcomputer has backup function |

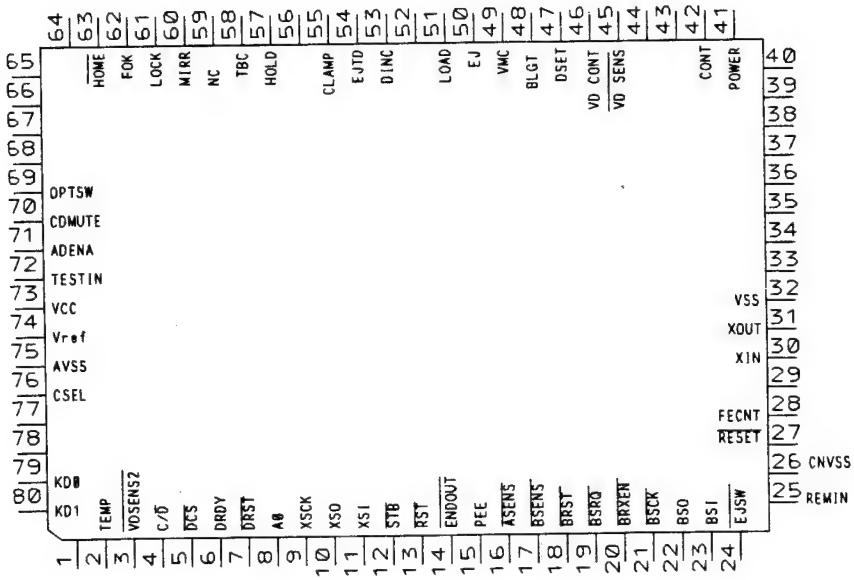
## • Pin Functions (PD5156C)

| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 1 | NC | | | Not used |
| 2 | TEMP | | | Temperature detector |
| 3 | $\overline{\text{VDSENSE2}}$ | - | | Short sense input |
| 4 | DCD | Output | NM | Command/data appointment output |
| 5 | $\overline{\text{DCS}}$ | Output | NM | Chip select output |
| 6 | DRDY | Input | | Ready input |
| 7 | $\overline{\text{DRST}}$ | Output | NM | Reset output |
| 8 | A0 | Output | NM | LSI data control signal |
| 9 | XSCK | Output | NM | LSI clock output |
| 10 | XSO | Output | NM | LSI data output |
| 11 | XSI | Input | NM | LSI data input |
| 12 | $\overline{\text{STB}}$ | Output | C | LSI strobe output |
| 13 | $\overline{\text{RST}}$ | Output | C | Reset output pin |
| 14 | $\overline{\text{ENDOUT}}$ | Output | C | Digital output enable signal |
| 15 | PEE | Output | C | Beep tone output |
| 16 | $\overline{\text{ASENS}}$ | Input | | ACC power sense input pin |
| 17 | $\overline{\text{BSENS}}$ | Input | | Back up power sense input pin |
| 18 | $\overline{\text{BRST}}$ | Input | | Bus communication reset input pin |
| 19 | $\overline{\text{BSRQ}}$ | Output | C | Bus communication service request output pin |
| 20 | $\overline{\text{BRXEN}}$ | Input/ Output | C | Bus communication reception enable input pin |
| 21 | $\overline{\text{BSCK}}$ | Input/ Output | C | Bus serial clock input/output |
| 22 | BSO | Output | C | Serial data output pin |
| 23 | BSI | Input | | Bus serial data input |
| 24 | $\overline{\text{EJSW}}$ | Input | | Eject signal input |
| 25 | REMIN | Input | | Remote control pulse input |
| 26 | CNVSS | | | Gnd |
| 27 | $\overline{\text{RESET}}$ | Input | | Reset input |
| 28 | FECNT | Output | C | |
| 29 | NC | | | Not used |
| 30 | XIN | Input | | Crystal oscillating element connection pin |
| 31 | XOUT | Output | C | Crystal oscillating element connection pin |
| 32 | VSS | | | GND |
| 33 – 40 | NC | | | Not used |
| 41 | POWER | Output | C | CD +5V control |
| 42 | CONT | Output | C | Servo driver power supply control |
| 43, 44 | NC | | | Not used |
| 45 | $\overline{\text{VDSENS}}$ | Input | | Over voltage sense input |
| 46 | VDCONT | Output | C | VD control output |
| 47 | DSET | Output | C | Disc set indicator control output |
| 48 | BLGT | Output | C | LCD back light control output |
| 49 | VMC | Output | C | Loading motor driver power supply |
| 50 | EJ | Output | C | Loading motor EJECT control |
| 51 | LOAD | Output | C | Loading motor LOAD control |
| 52 | NC | | | Not used |
| 53 | DINC | Input | | Disc insert sense input |
| 54 | EJTD | Input | | Disc eject position sense input "H":FM, "L":AM |
| 55 | CLAMP | Input | | Disc clamp sense input |
| 56 | NC | | | Not used |

| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 57 | HOLD | Output | C | Hold control output |
| 58 | TBC | Output | C | Tracking bank switching output |
| 59 | NC | | | Not used |
| 60 | MIRR | Input | | Mirror detector input |
| 61 | LOCK | Input | | Spindle lock detector input |
| 62 | FOK | Input | | FOK signal input |
| 63 | $\overline{\text{HOME}}$ | Input | | Home position detector input |
| 64-68 | NC | | | Not used |
| 69 | OPTSW | Input | | Digital output ON/OFF input |
| 70 | CDMUTE | Output | C | CD mute output |
| 71 | ADENA | Output | C | A/D reference voltage output |
| 72 | TESTIN | Input | | Test program mode input |
| 73 | VCC | | | Back up 5V |
| 74 | VREF | Input | | A/D reference voltage input |
| 75 | AVSS | | | A/D GND |
| 76 | CSEL | | | Compression select |
| 77, 78 | NC | | | Not used |
| 79 | KD0 | | | Analog key input 0 |
| 80 | KD1 | | | Analog key input 1 |

| I/O Format | Meaning |
|---|---|
| C | CMOS output |
| NM | Middle resistivity<br>N channel open drain |

*PD5156C

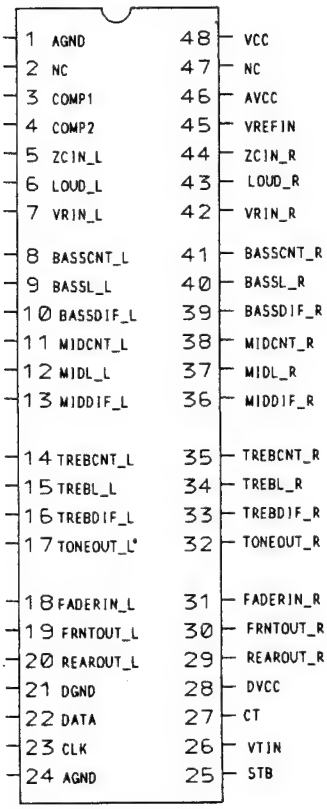


## • Pin Function (PMJ001A)

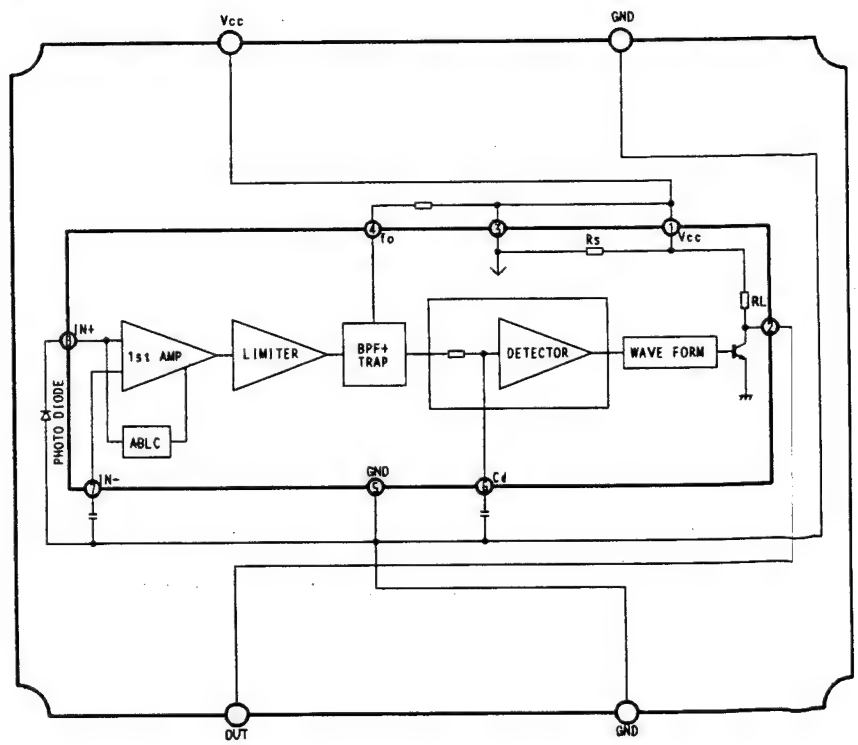
| Pin No | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1 | AGND | | Analog GND |
| 2 | NC | | Non connect |
| 3 | COMP1 | | Reference voltage circuit, phase compensation terminal 1 |
| 4 | COMP2 | | Reference voltage circuit, phase compensation terminal 2 |
| 5 | ZCIN_L | Input | Lch:Zero cross detection circuit input |
| 6 | LOUD_L | | Lch:Loudness setting terminal |
| 7 | VRIN_L | Input | Lch:Input. Hot side of volume |
| 8 | BASSCNT_L | | Lch:Low frequency control terminal |
| 9 | BASSL_L | | Lch:Pseudo inductor terminal for low frequencies |
| 10 | BASSDIF_L | | Lch:Pseudo inductor differential input terminal for low frequencies |
| 11 | MIDCNT_L | | Lch:Medium frequency control terminal |
| 12 | MIDL_L | | Lch:Pseudo inductor terminal for medium frequencies |
| 13 | MIDDIF_L | | Lch:Pseudo inductor differential input terminal for medium frequencies |
| 14 | TREBCNT_L | | Lch:High frequency control terminal |
| 15 | TREBL_L | | Lch:Pseudo inductor terminal for high frequencies |
| 16 | TREBDIF_L | | Lch:Pseudo inductor differential input terminal for high frequencies |
| 17 | TONEOUT_L | Output | Lch:Buffer output terminal for the tone control circuit |
| 18 | FADERIN_L | Input | Lch:Fader circuit input terminal |
| 19 | FRNTOUT_L | Output | Lch:Front buffer output circuit |
| 20 | REAROUT_L | Output | Lch:Rear buffer output circuit |
| 21 | DGND | | Digital GND terminal |
| 22 | DATA | Input | Serial data input terminal |
| 23 | CLK | Input | Clock input terminal |
| 24 | AGND | | Analog GND |
| 25 | STB | Input | Latch strobe input terminal |
| 26 | VTIN | Input | Applies half of digital control power source controlling this IC |
| 27 | CT | | Time constant terminal for forced switching time setting till zero cross detection |
| 28 | DVCC | Input | Digital power source terminal |
| 29 | REAROUT_R | Output | Rch:Rear buffer output circuit |
| 30 | FRNTOUT_R | Output | Lch:Front buffer output circuit |
| 31 | FADERIN_R | Input | Rch:Fader circuit input terminal |
| 32 | TONEOUT_R | Output | Rch:Buffer output terminal for the tone control circuit |
| 33 | TREBDIF_R | | Rch:Pseudo inductor differential input terminal for high frequencies |
| 34 | TREBL_R | | Rch:Pseudo inductor terminal for high frequencies |
| 35 | TREBCNT_R | | Rch:High frequency control terminal |
| 36 | MIDDIF_R | | Rch:Pseudo inductor differential input terminal for low frequencies |
| 37 | MIDL_R | | Rch:Pseudo inductor terminal for medium frequencies |
| 38 | MIDCNT_R | | Rch:Medium frequency control terminal |
| 39 | BASSDIF_R | | Rch:Pseudo inductor differential input terminal for low frequencies |
| 40 | BASSL_R | | Rch:Pseudo inductor terminal for low frequencies |
| 41 | BASSCNT_R | | Rch:Low frequency control terminal |
| 42 | VRIN_R | Input | Rch:Input. Hot side of volume |
| 43 | LOUD_R | | Rch:Loudness setting terminal |
| 44 | ZCIN_R | Input | Rch:Zero cross detection circuit input |

| Pin No | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 45 | VREFIN | Input | Reference voltage input terminal |
| 46 | AVCC | Output | Internal stabilized power source terminal |
| 47 | NC | | |
| 48 | VCC | | Power terminal |

PMJ001A




RS-20C



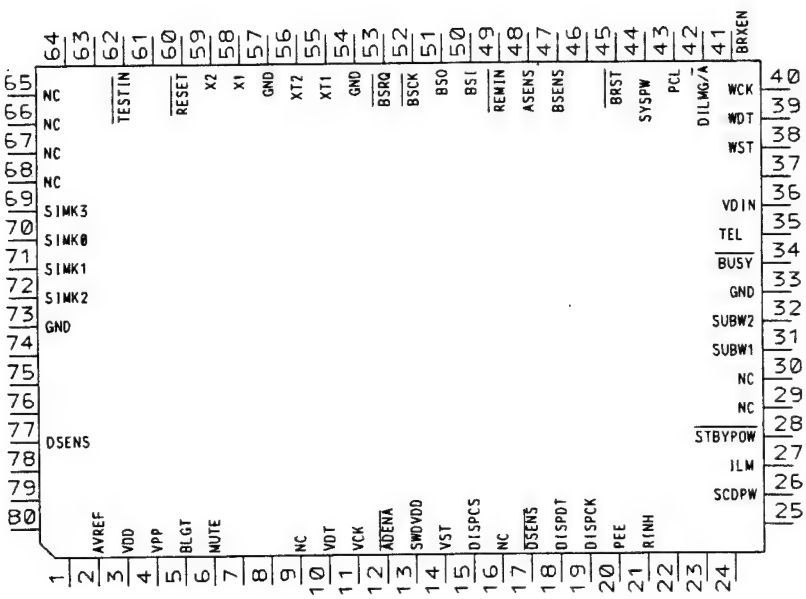
## • Pin Functions (PD4348C)

| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 1 | NC | Input | | GND |
| 2 | AVREF | Input | | A/D converter reference voltage input |
| 3 | VDD | | | VDD |
| 4 | VDD | | | PROM write power supply |
| 5 | BLGT | Output | C | Back light control output |
| 6 | MUTE | Output | C | System mute ON/OFF output |
| 7-9 | NC | Output | C | Open |
| 10 | VDT | Output | C | Electrical volume data output |
| 11 | VCK | Output | C | Electrical volume clock output |
| 12 | $\overline{\text{ADENA}}$ | Output | C | AVREF enable output |
| 13 | SWVDD | Output | C | Key micro computer power supply control output |
| 14 | VST | Output | C | Electrical volume strobe output |
| 15 | DISPCS | Output | C | Key/display micro computer chip select output |
| 16 | NC | Output | C | Open |
| 17 | NC | Input | | Connect to VDD |
| 18 | DISPDT | Output | C | Key/display micro computer data output |
| 19 | $\overline{\text{DISPCK}}$ | Output | C | Key/display micro computer clock output |
| 20 | PEE | Output | C | Beep tone output |
| 21-25 | NC | Input | | Connect to GND |
| 26 | SCDPW | Output | C | S-CD ON/$\overline{\text{OFF}}$ output |
| 27 | ILM | Output | C | Illumination control output |
| 28 | $\overline{\text{STBYPW}}$ | Output | C | Power supply IC control |
| 29, 30 | NC | Output | NM | Open |
| 31 | SUBW1 | Output | NM | Sub woofer frequency switching multiplexer control output 1 |
| 32 | SUBW2 | Output | NM | Sub woofer frequency switching multiplexer control output 2 |
| 33 | GND | | | |
| 34 | $\overline{\text{BUSY}}$ | Input | | Key/display micro computer BUSY input |
| 35 | TEL | Input | | TEL mute ON/$\overline{\text{OFF}}$ input |
| 36 | VDIN | Input | | VD sense input |
| 37 | NC | Input | | |
| 38 | WST | Output | C | Sub woofer electrical volume strobe output |
| 39 | WDT | Output | C | Sub woofer electrical volume data output |
| 40 | WCK | Output | C | Sub woofer electrical volume clock output |
| 41 | BRXEN | | | Bus reception enable line |
| 42 | DIMLG/$\overline{\text{A}}$ | Output | C | Dual illumination green/$\overline{\text{amber}}$ output |
| 43 | PCL | Output | C | Clock adjustment output |
| 44 | SYSPW | Output | C | System power supply control output |
| 45 | $\overline{\text{BRST}}$ | Output | C | Reset output |
| 46 | NC | Input | | |
| 47 | BSENS | Input | | Back-up sense input |
| 48 | ASENS | Input | | ACC sense input |
| 49 | $\overline{\text{REMIN}}$ | Input | | Key micro computer signal input |
| 50 | BSI | Input | | BUS serial data input |
| 51 | BSO | Output | | BUS serial data output |
| 52 | $\overline{\text{BSCK}}$ | | | Serial data clock input/output |
| 53 | BSRQ | Input | | Polling request input |
| 54 | GND | | | |
| 55 | XT1 | | | Connect to GND |
| 56 | XT2 | | | NC |

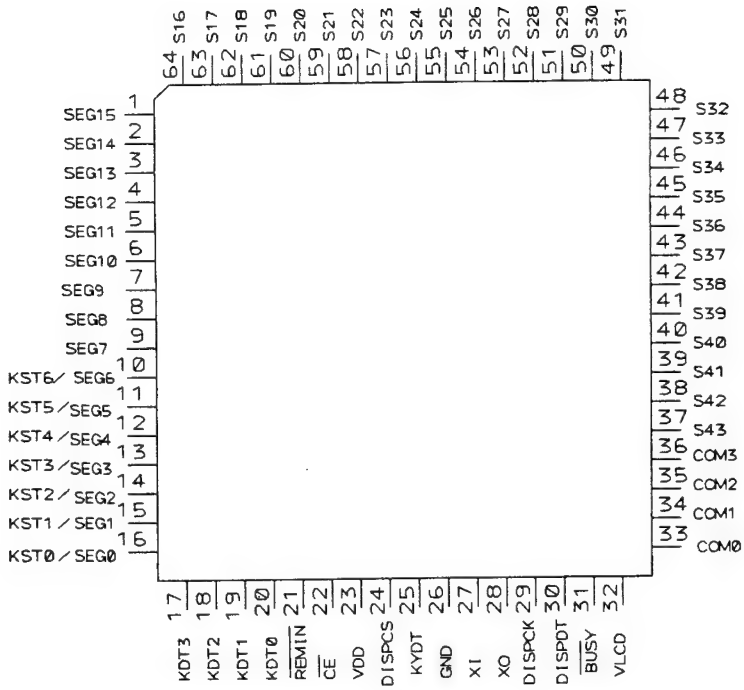
| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 57 | IC | | | Connect to GND |
| 58 | X1 | | | Oscillator |
| 59 | X2 | | | Oscillator |
| 60 | $\overline{\text{RESET}}$ | Input | | Reset input |
| 61 | NC | Input | | |
| 62 | $\overline{\text{TESTIN}}$ | Input | | Test mode |
| 63, 64 | NC | Input | | Connect to GND |
| 65-67 | NC | Output | NM | Open |
| 68 | NC | Output | NM | Reset |
| 69 | SIMK3 | Input | | Model select input 3 |
| 70 | SIMK0 | Input | | Model select input 0 |
| 71 | SIMK1 | Input | | Model select input 1 |
| 72 | SIMK2 | Input | | Model select input 2 |
| 73-76 | AGND | | | Connect to GND |
| 77 | DSENS | Input | | Front panel EJECT/REPLACE sensor input |
| 78-80 | NC | | | Connect to GND |

| I/O Format | Meaning |
|---|---|
| C | CMOS output |
| NM | Middle resistivity<br>N channel open drain |

*PD4348C



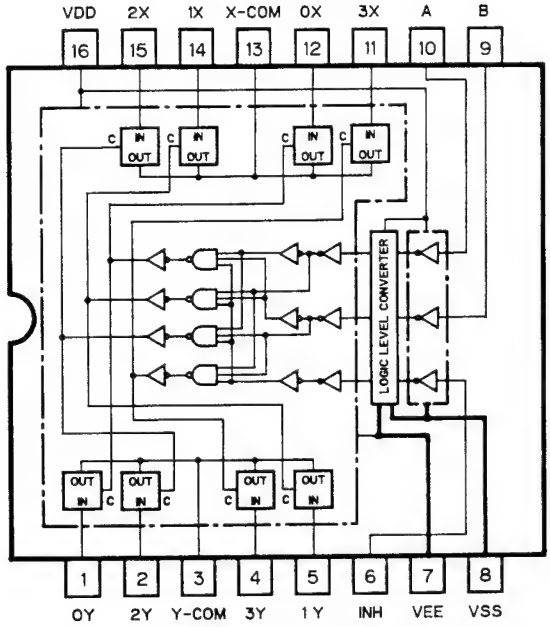
*GGF-921



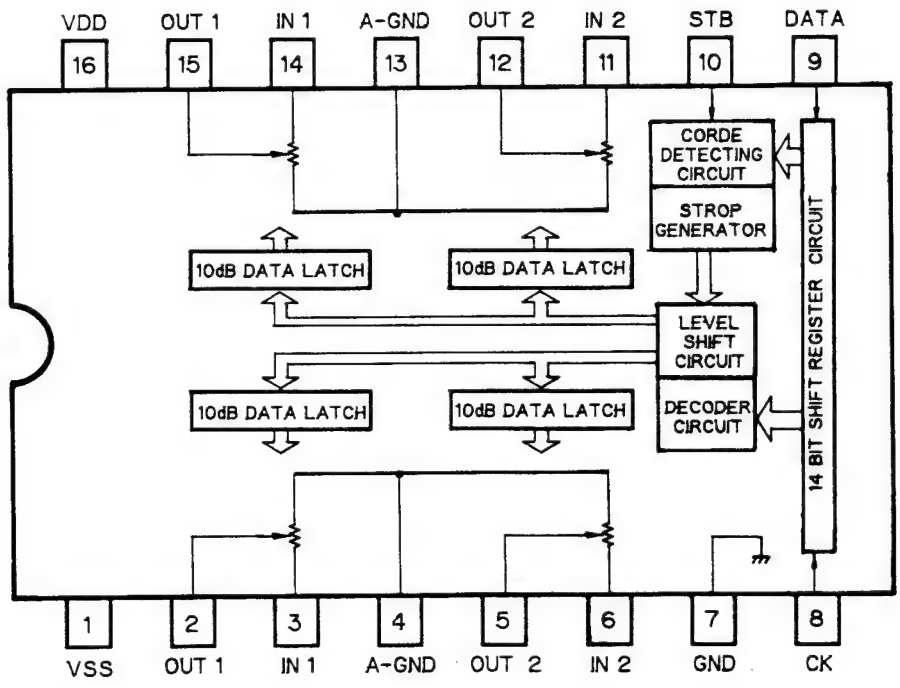

## • Pin Functions (GGF-921)

| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 1—9 | SEG15 – 7 | Output | | LCD segment output |
| 10 \| 16 | KST6/SEG6 \| KST0/SEG0 | Output | | Key strobe/LCD segment output |
| 17—20 | KDT3-KDT0 | Input | | Key data input |
| 21 | $\overline{\text{REMIN}}$ | Input | | Remote control signal input |
| 22 | $\overline{\text{CE}}$ | | | Device select input(Reset) |
| 23 | VDD | | | |
| 24 | DISPCS | Input | | Display data communication chip select |
| 25 | KYDT | Output | | Remote control data output |
| 26 | GND | | | |
| 27, 28 | XI, XO | | | Crystal oscillating element connection pin |
| 29 | DISPCK | Input | | Display data communication clock input |
| 30 | DISPDT | Input | | Display data communication data input |
| 31 | $\overline{\text{BUSY}}$ | Output | | Display data communication BUSY output |
| 32 | VLCD | | | Power supply for LCD |
| 33—36 | COM0—COM3 | | | Common output |
| 37—64 | S43—S16 | Output | | LCD segment output |

TC4052BF




TC9213P

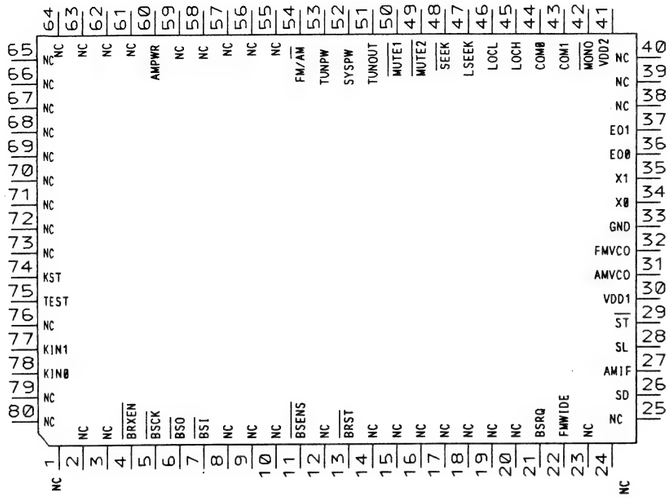


## • Pin Functions (GGF-927)

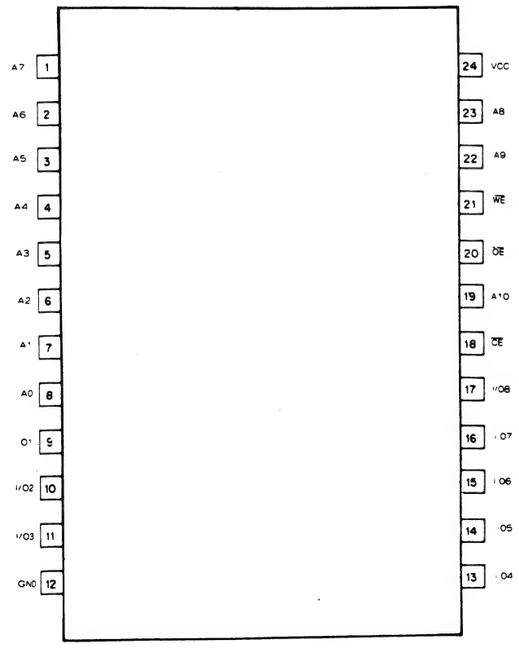
| Pin No. | Pin Name | I/O | I/O Format | Function and Operation |
|---|---|---|---|---|
| 1—3 | NC | | | Not used |
| 4 | $\overline{\text{BRXEN}}$ | I/O | N | Busy input pin |
| 5 | $\overline{\text{BSCK}}$ | I/O | | Serial clock input pin |
| 6 | $\overline{\text{BSO}}$ | Input | | Serial data Input pin |
| 7 | $\overline{\text{BSI}}$ | Input | | Serial data input pin |
| 8—10 | NC | | | Not used |
| 11 | $\overline{\text{BSENS}}$ | Input | | Back up power sense input pin |
| 12 | NC | | | Not used |
| 13 | $\overline{\text{BRST}}$ | Input | | Bus communication reset input pin |
| 14—20 | NC | | | Not used |
| 21 | BSRQ | Output | C | Bus communication service request output pin |
| 22 | FMWIDE | Output | C | FM wide output pin |
| 23—25 | NC | | | Not used |
| 26 | SD | Input | | SD signal input pin |
| 27 | AMIF | Input | | AM IF input pin |
| 28 | SL | Input | | Signal level input pin |
| 29 | $\overline{\text{ST}}$ | Input | | Stereo broadcast detection signal input pin |
| 30 | VDD1 | | | Device power supply terminal |
| 31 | AMVCO | Input | | AM VCO signal input pin |
| 32 | FMVCO | Input | | FM VCO signal input pin |
| 33 | GND | | | GND |
| 34 | XO | Output | | Crystal oscillating element connection pin |
| 35 | XI | Input | | Crystal oscillating element connection pin |
| 36 | EO0 | Output | C | PLL error output 0 pin |
| 37 | EO1 | Output | C | PLL error output 1 pin |
| 38—40 | NC | | | Not used |
| 41 | VDD2 | | | Device power supply pin |
| 42 | $\overline{\text{MONO}}$ | Output | C | Forced mono output pin |
| 43, 44 | NC | | | Not used |
| 45 | LOCH | Output | C | Local H setup output pin |
| 46 | LOCL | Output | C | Local L setup output pin |
| 47 | LSEEK | Output | C | Outputs high signal during BSM local SEEK operation. |
| 48 | $\overline{\text{SEEK}}$ | Output | C | SEEK output pin<br>Outputs low signal during SEEK operation. |
| 49 | $\overline{\text{MUTE2}}$ | Output | C | Mute output when tuner/CD multi switching |
| 50 | $\overline{\text{MUTE1}}$ | Output | C | Tuner mute output pin |
| 51 | TUNOUT | Output | C | Tuner/CD multi audio signal switching control pin<br>"H":Tuner, "L":CD multi |
| 52 | SYSPW | Output | C | System power output pin |
| 53 | TUNPW | Output | C | Tuner power output pin |
| 54 | FM/$\overline{\text{AM}}$ | Output | C | FM/AM power select output pin "H":FM, "L":AM |
| 55—59 | NC | | | Not used |
| 60 | AMPWR | Output | C | "H" output when AM |
| 61—73 | NC | | | Not used |
| 74 | KST | Output | C | Strobe output pin |
| 75 | TEST | Input | RDW | TEST mode input pin |
| 76 | NC | | | Not used |
| 77 | KIN1 | Input | RDW | Return input 1 |
| 78 | KIN0 | Input | RDW | Return input 0 |
| 79, 80 | NC | | | Not used |

| I/O Format | Meaning |
|---|---|
| C | CMOS output |
| N | N channel open drain |
| RDW | With pull down resistor |

*GGF-927

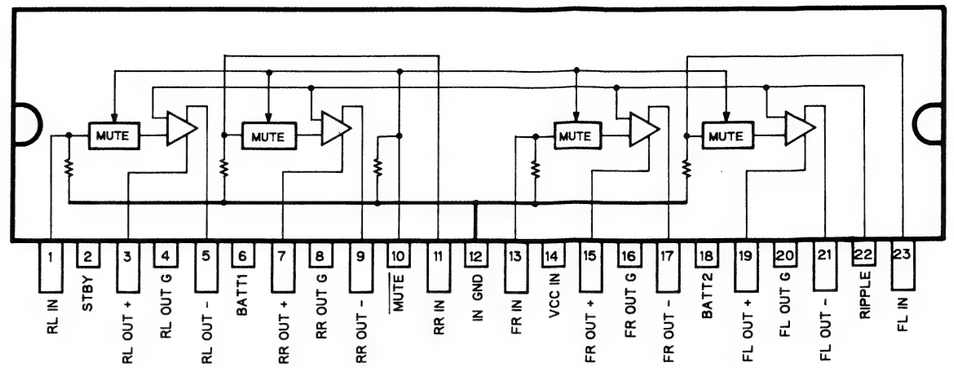



LH5116HN-10T

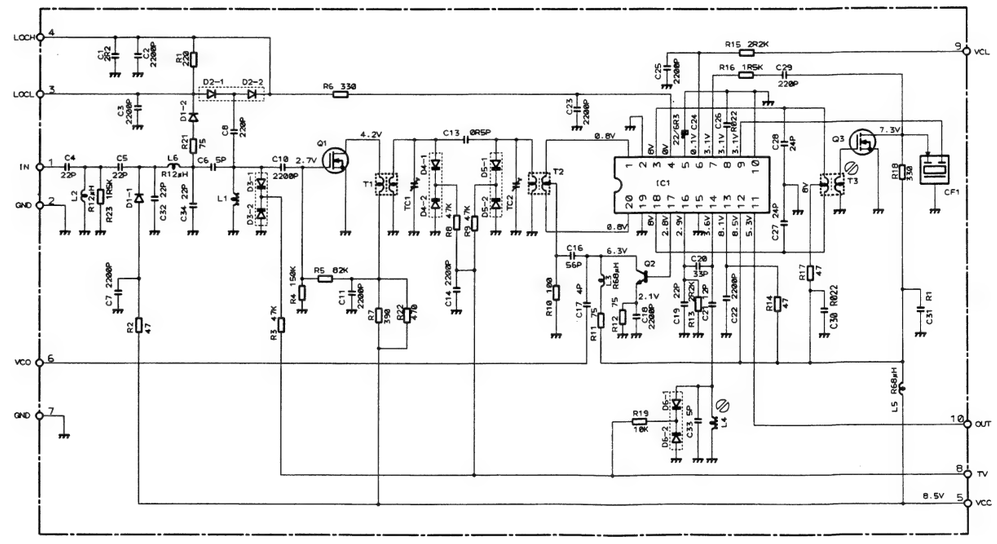





PA3027A




## • FM Front End (CWB1063, CWB1064)




NOTE:

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

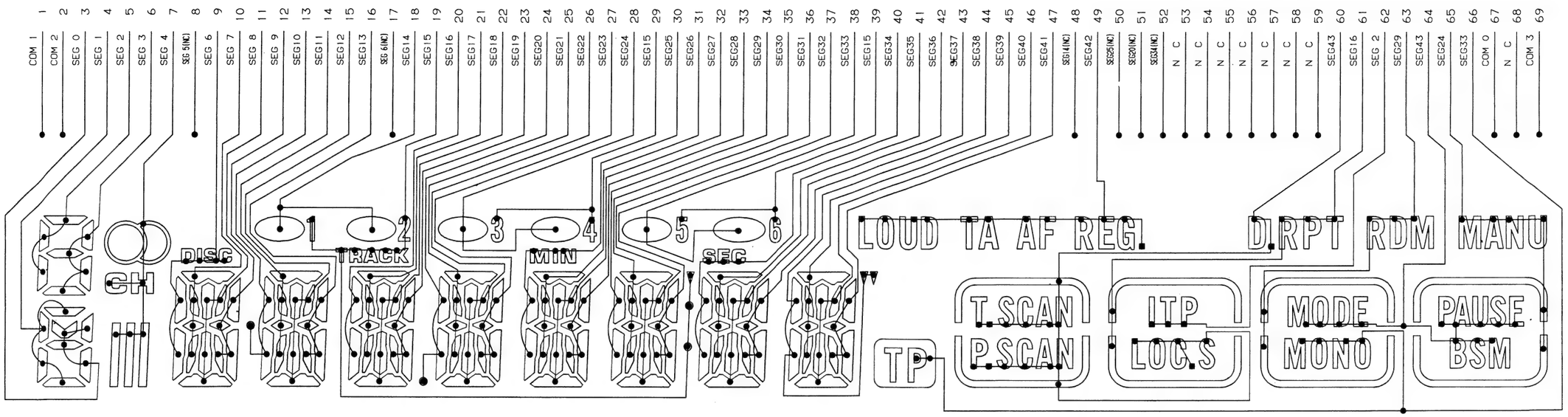
Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

Fig. 42

- **LCD (CAW1140, CAW1181)**

**SEGMENT**




**COMMON**

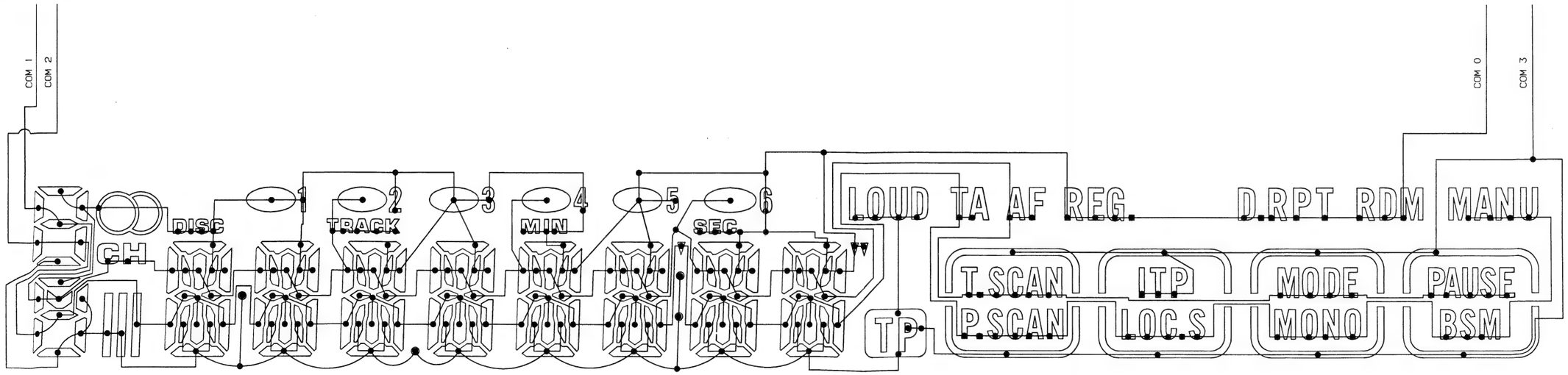
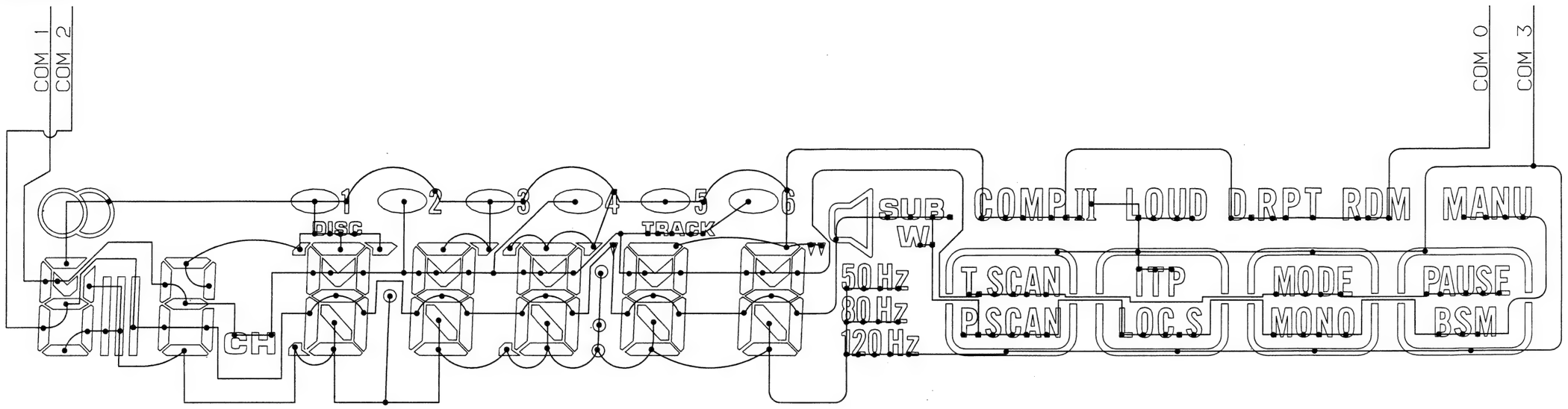



Fig. 43

• **LCD (CAW1141)**

**COMMON**




**SEGMENT**

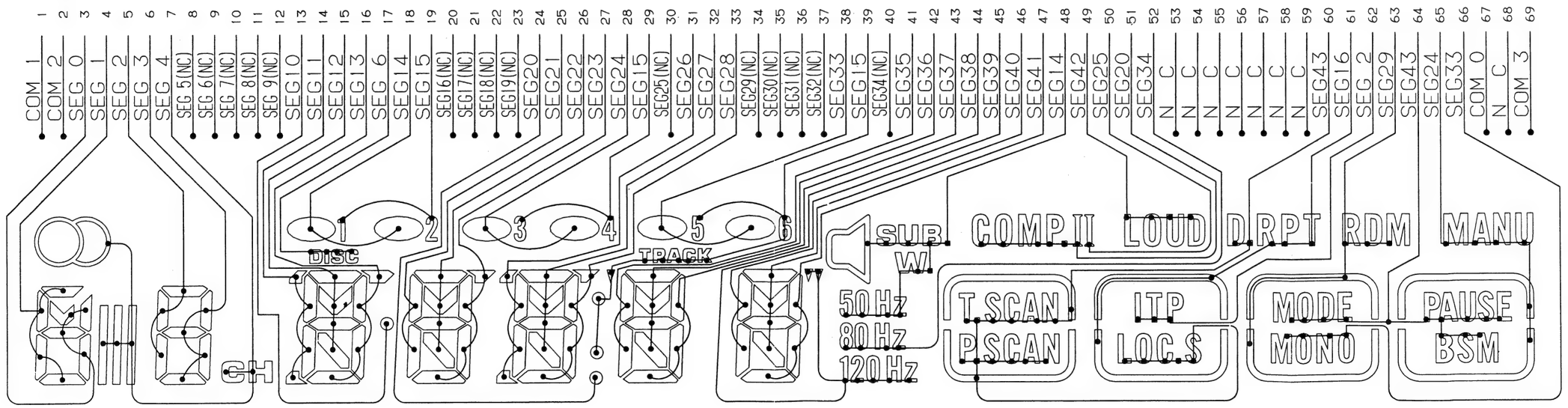



Fig. 44

# 11. CIRCUIT DIAGRAM AND P.C.BOARD PATTERN

- **Tuner Amp Unit (DEH-M980RDS/EW, X1B)**

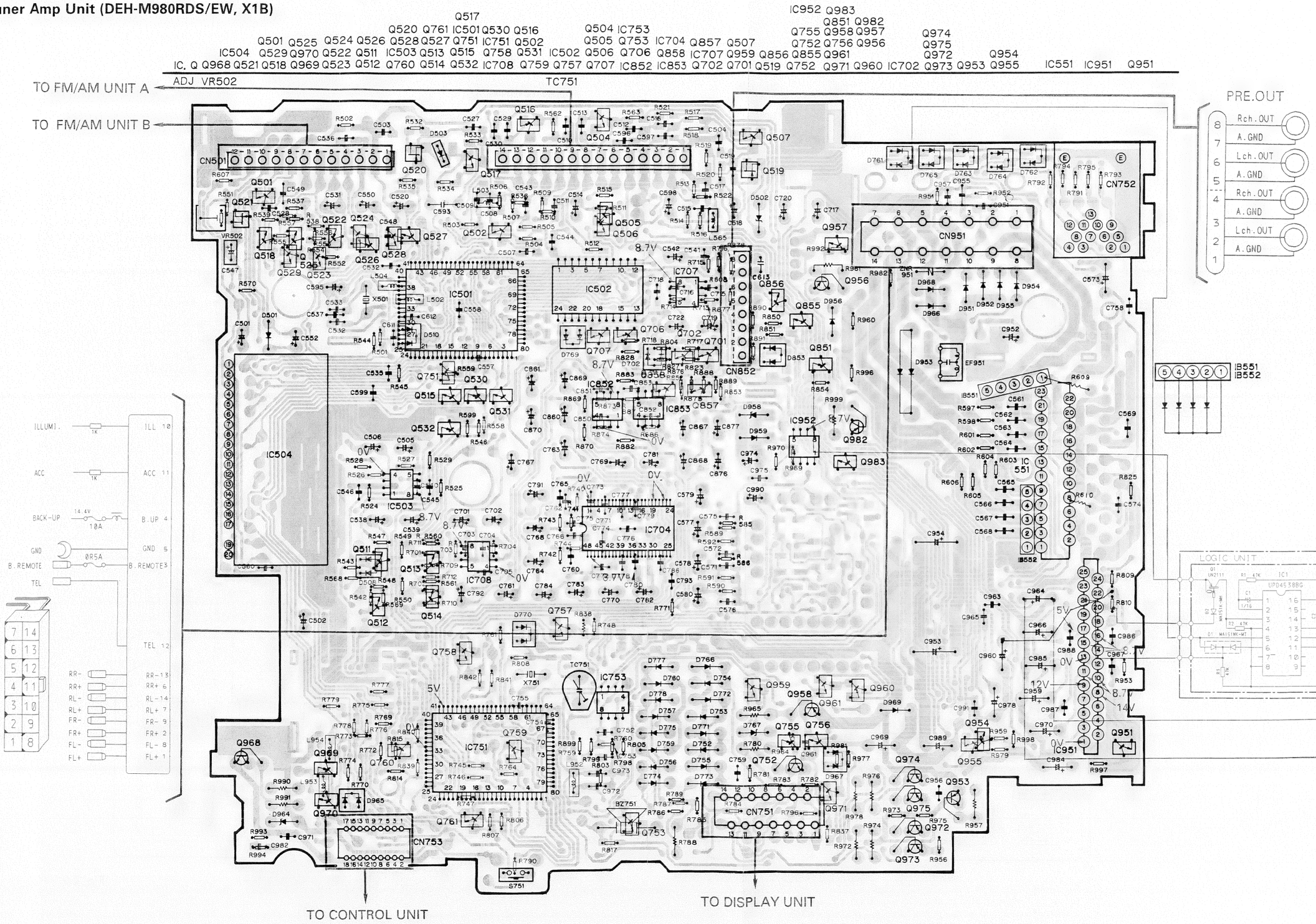
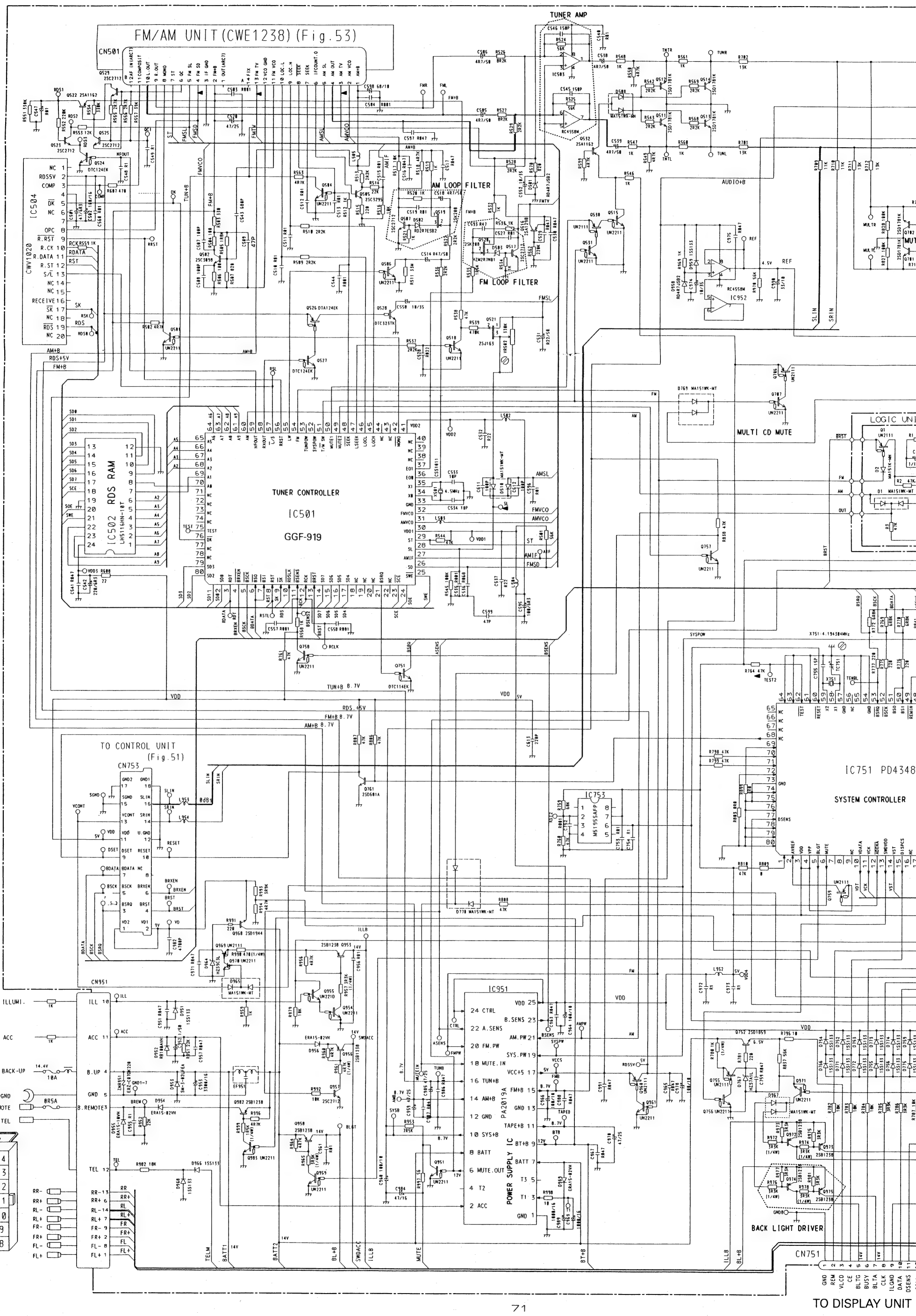



Fig. 45

## • Tuner Amp Unit (DEH-M980RDS/EW, X1B)



NOTE:

⊏⊐ Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

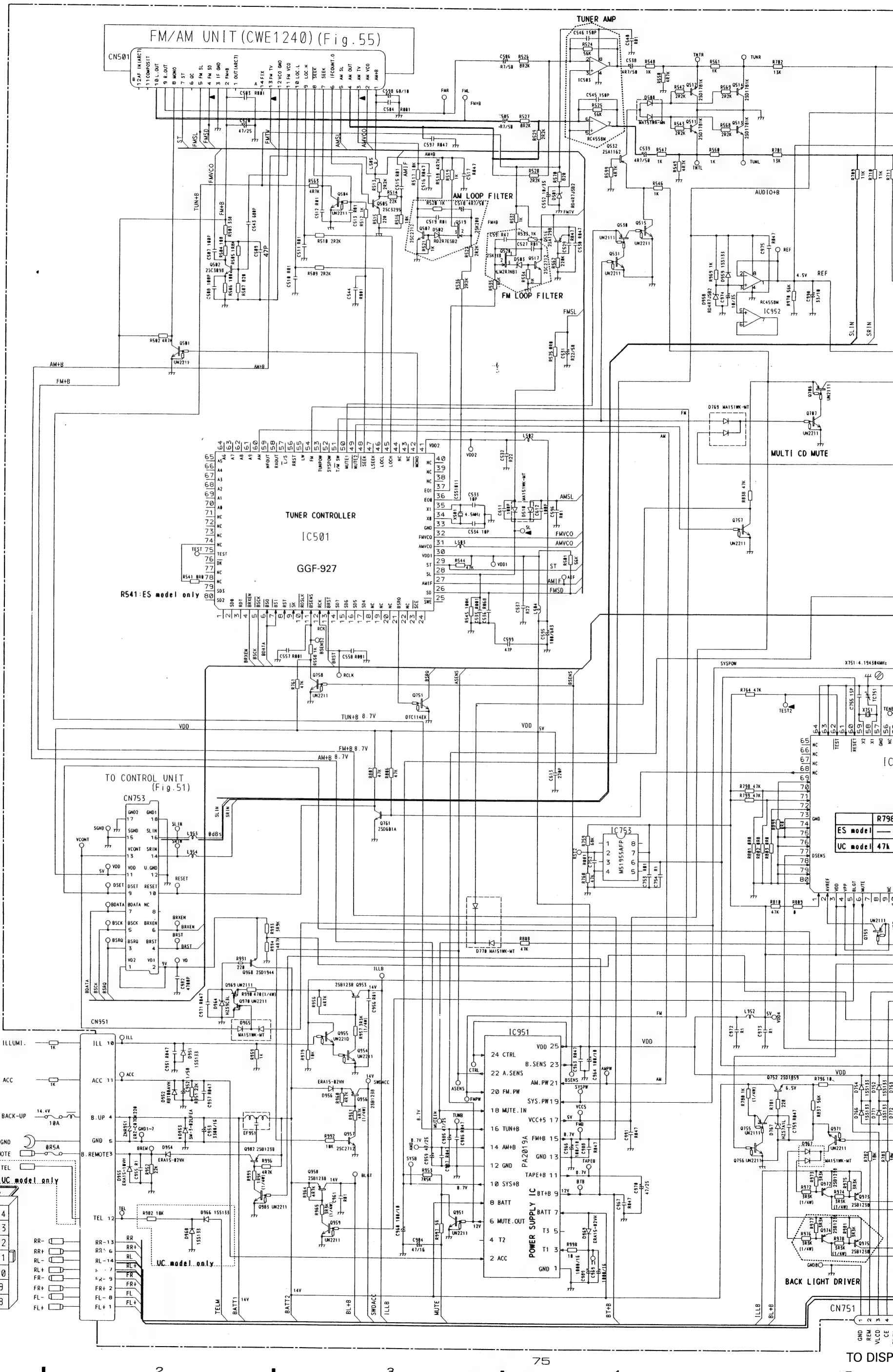
⊣⊢ Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

MIXING AMP
MULTI CD AMP
MUTE
LOGIC UNIT
UPD4538BG
IC704 E.VOLUME
PMJ881A
REAR PRE AMP
FRONT PRE AMP
Pre.OUT
TO MULTI-CD PLAYER
IC751 PD4348C
SYSTEM CONTROLLER
POWER AMP
4ch
IC551 PA3027A
DISPLAY UNIT (Fig. 57)

Fig. 46

- **Tuner Amp Unit (DEH-M980/UC, M940/ES)**



NOTE :

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

MIXING AMP
IC708 RC4558M
MULTI CD AMP
IC707 RC4558M
MUTE
IC704 E.VOLUME
PMJ881A
REAR PRE AMP
IC852 RC4558M
FRONT PRE AMP
IC853 RC4558M
Pre.OUT
CN852
CN752
R.IN
L.IN
ACC
MRIN
MLIN -4dBs
TO MULTI-CD PLAYER
PREMUTE
IC751 PD4348C
SYSTEM CONTROLLER
X751:4.194304MHz
UC model only
POWER AMP
4ch IC551 PA3027A
IB551 CNW1538
IB552 CNW1538
CN751
TO DISPLAY UNIT (Fig. 57)
+3dBs
+10dBs
-36dBs
STBY
PEE
RESET.SW

| | R798 | R799 | R801 | R802 |
|---|---|---|---|---|
| ES model | — | 47k | 0 | — |
| UC model | 47k | — | — | 0 |

Fig. 47

## • Tuner Amp Unit (DEH-M980/UC, M940/ES)

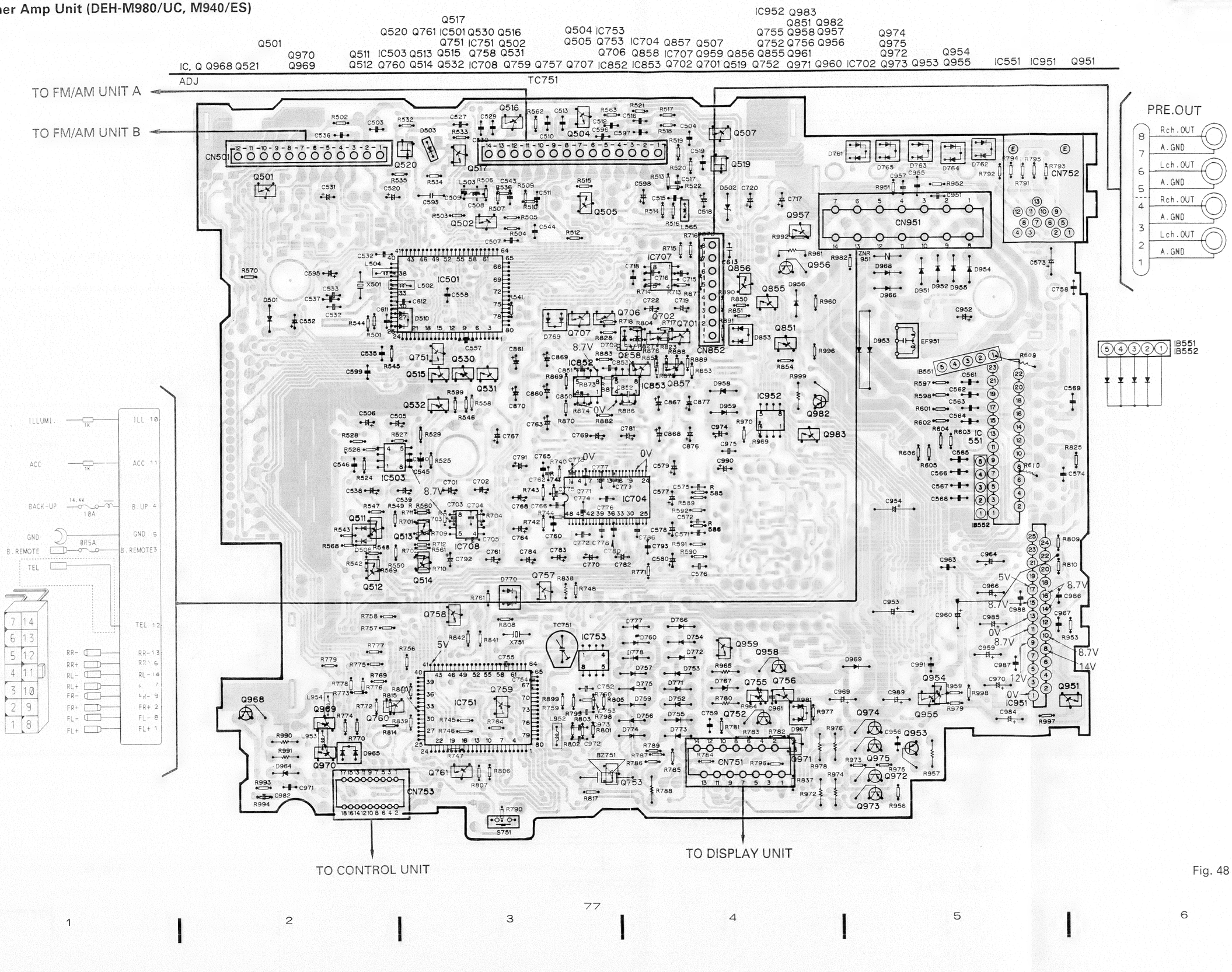



Fig. 48

• **Tuner Amp Unit (DEH-M77/US)**

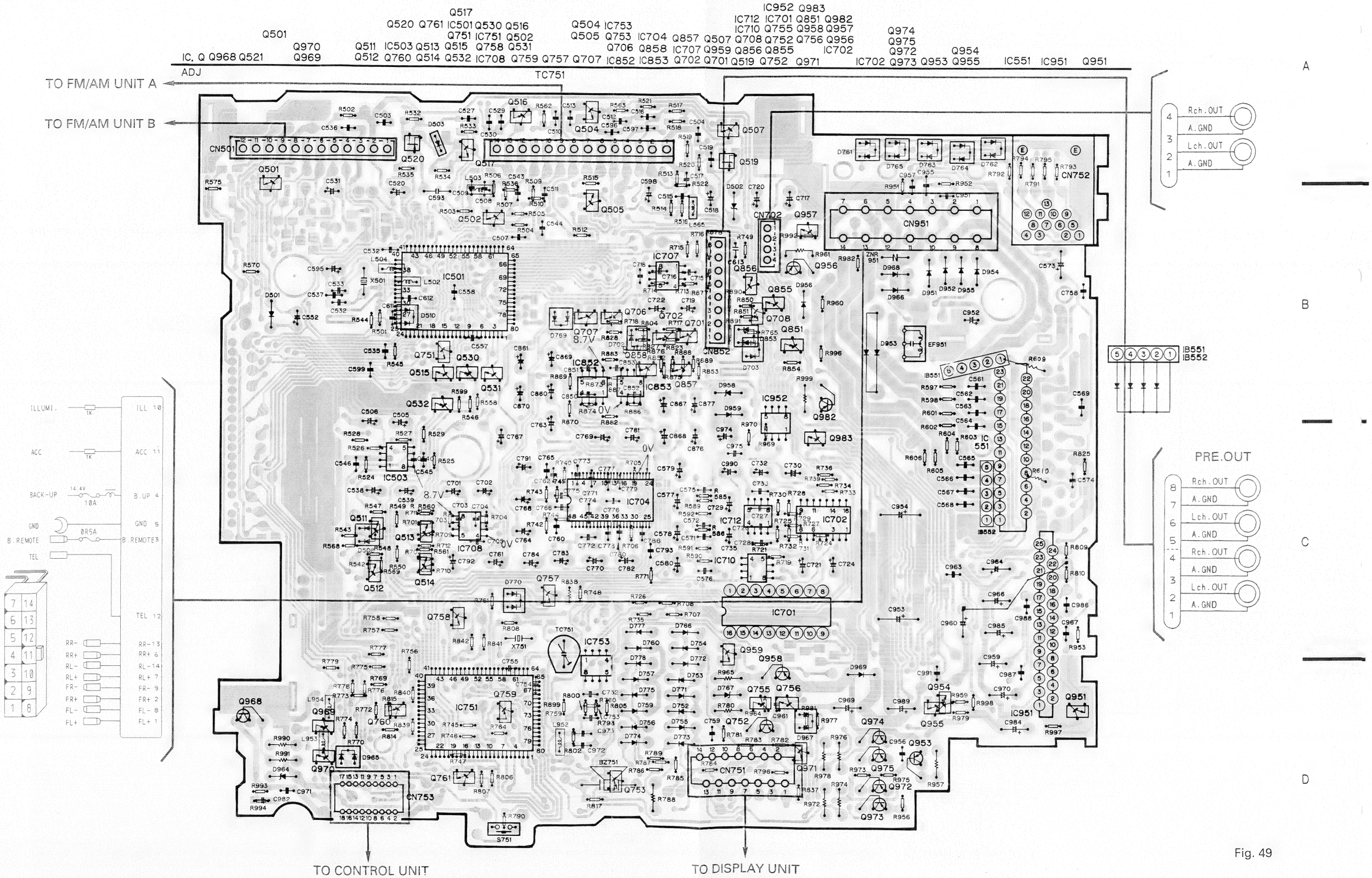
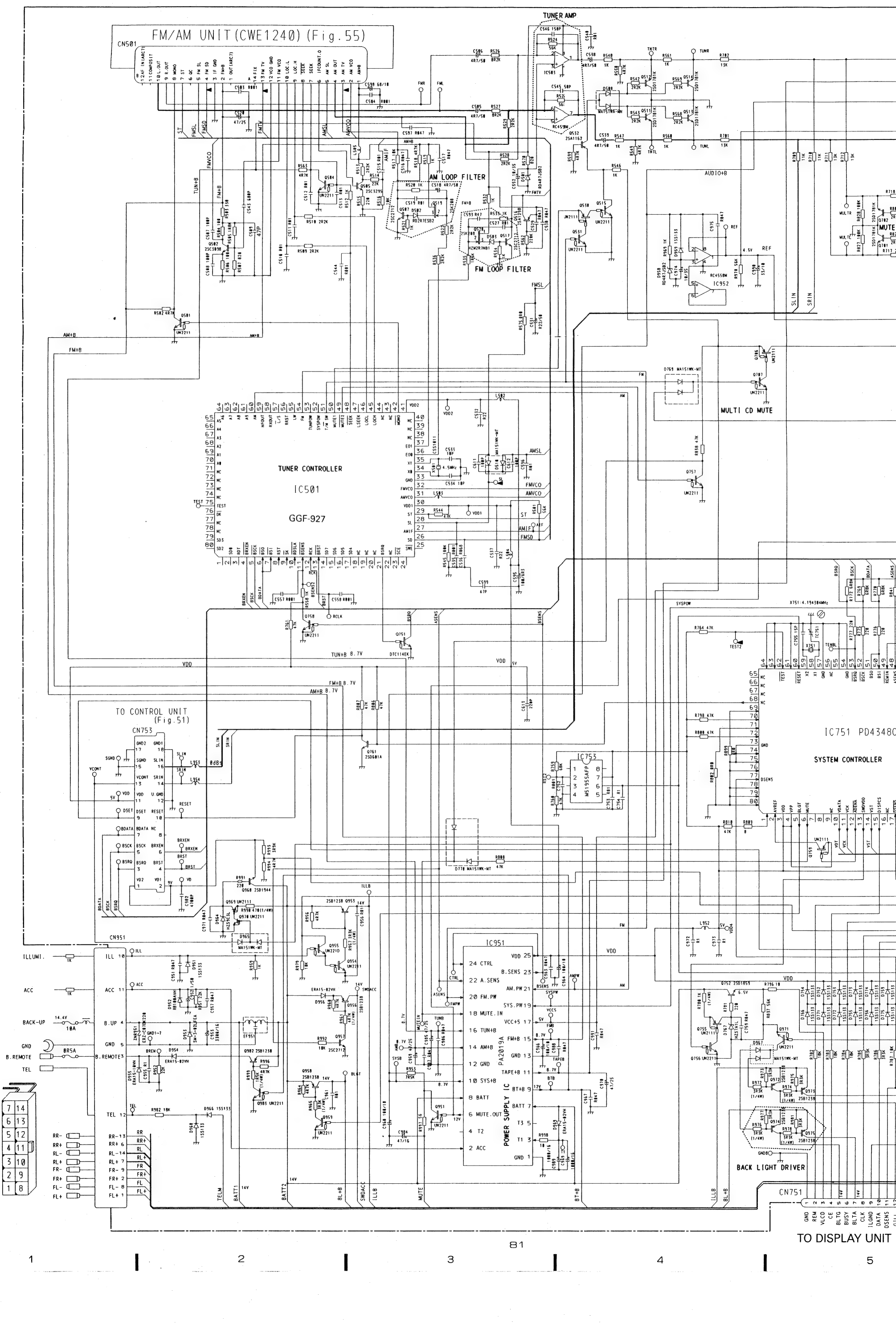



Fig. 49

## • Tuner Amp Unit (DEH-M77/US)



NOTE:

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

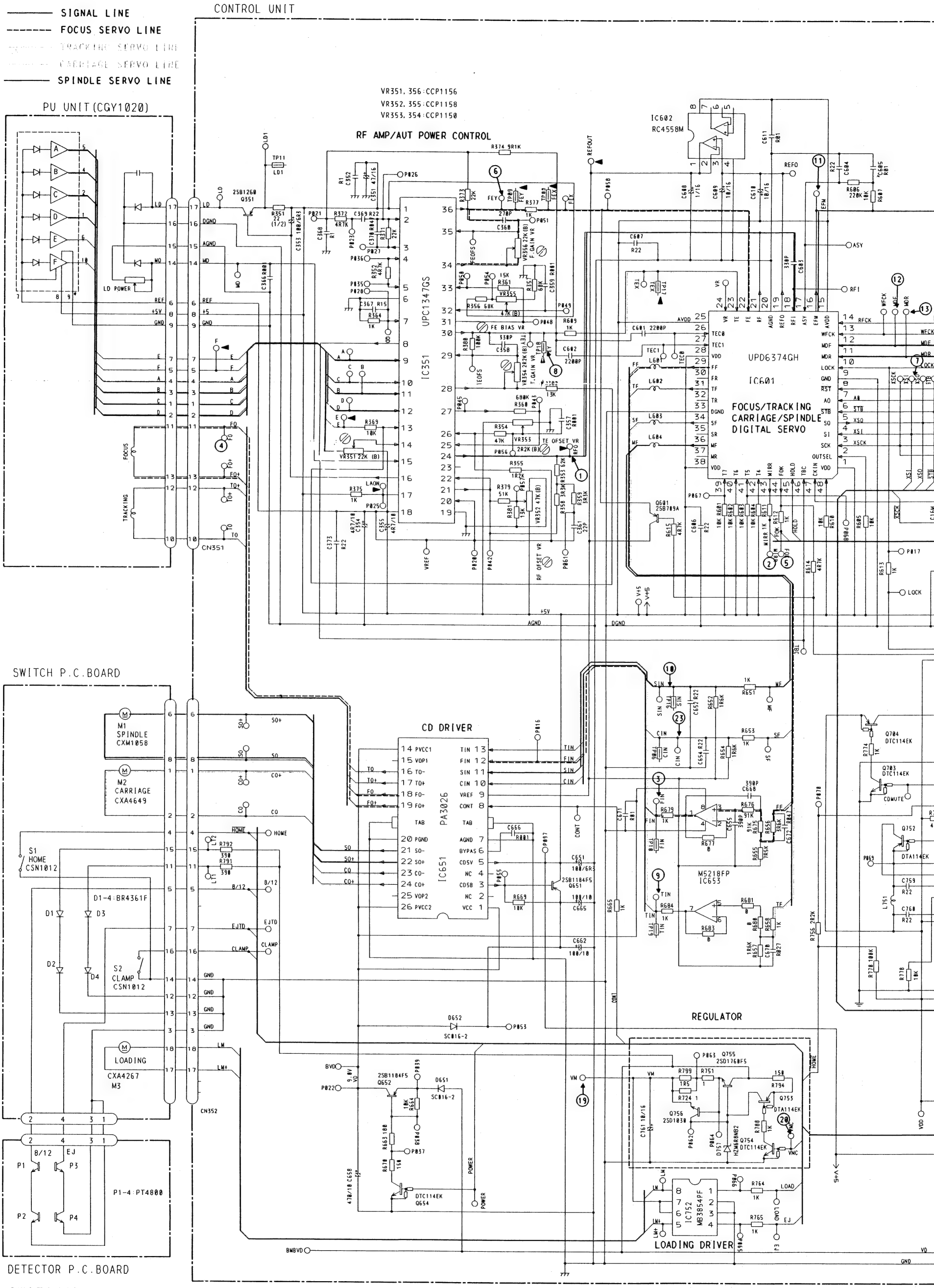
Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

MIXING AMP
IC708
MULTI CD AMP
IC707
MUTE
BUFFER AMP
IC710 RC4558M
IC712 RC4558M
IC701
SUB W.E. VOLUME
TC9213P
H.P.F
IC702 TC4052BF
MPX
L.P.F
IC704 E.VOLUME
PMJ001A
REAR PRE AMP
IC852 RC4558M
FRONT PRE AMP
IC853 RC4558M
IC751 PD4348C
STEM CONTROLLER
POWER AMP
4ch
IC551 PA3027A
IB551 CWW1350
IB552 CWW1350
Q851 2SA1162
Q852 2SA1162
Q753 UN2211
BZ751 CPV1010
S751 RESET.SW
CN702
CN752
CN852
TO MULTI-CD PLAYER
Pre.OUT
SUB.W OUT
A.GND
R.IN
L.IN
ACC
Rch.OUT
Lch.OUT
MRIN
MLIN -4dBs
+3dBs
+10dBs
+36dBs
AUDIO+B
REF
PREMUTE
S.VDD
SWO
SWDACC
STBY
BATT1
BATT2
TELM
MUTE
VDIN
WCK
WDT
WST
VST
VCK
VDT
FL
FR
RL
RR
FLIN
FRIN
RLIN
RRIN
BSCK
BDATA
BSRQ
BRXEN
BRST

Fig. 50

DISPLAY UNIT (Fig. 57)

- **CD Mechanism Module**




SWITCHES:

**SWITCH P.C. BOARD**

S1 : HOME SWITCH ..... ON–OFF

S2 : CLAMP SWITCH ..... ON–OFF

The underlined indicates the switch position.

NOTE:

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

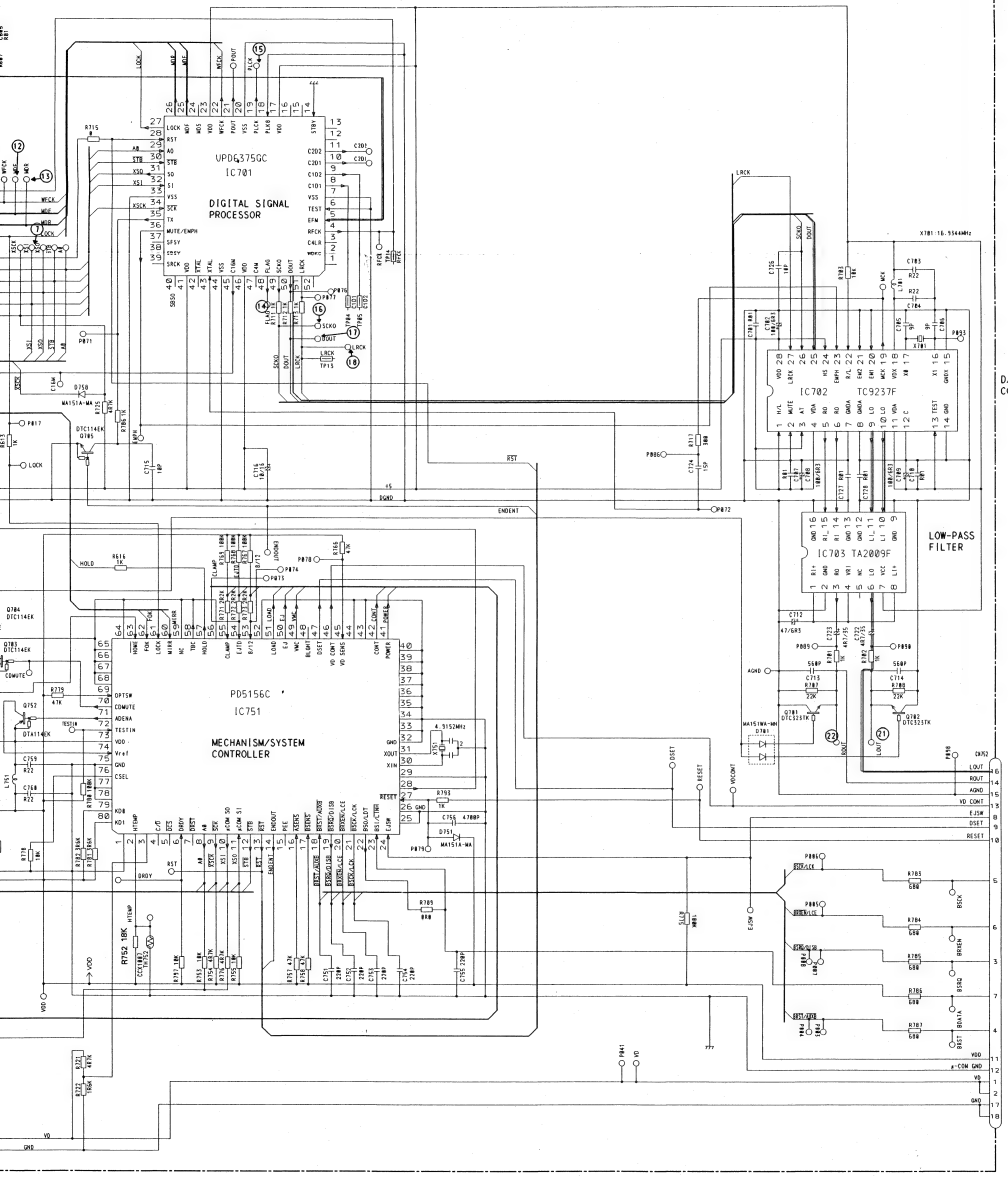
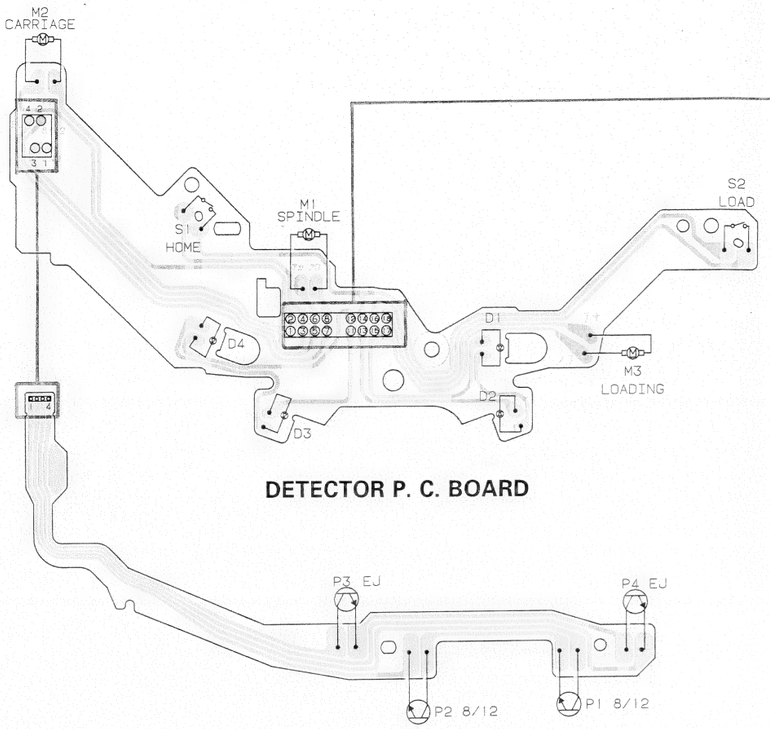


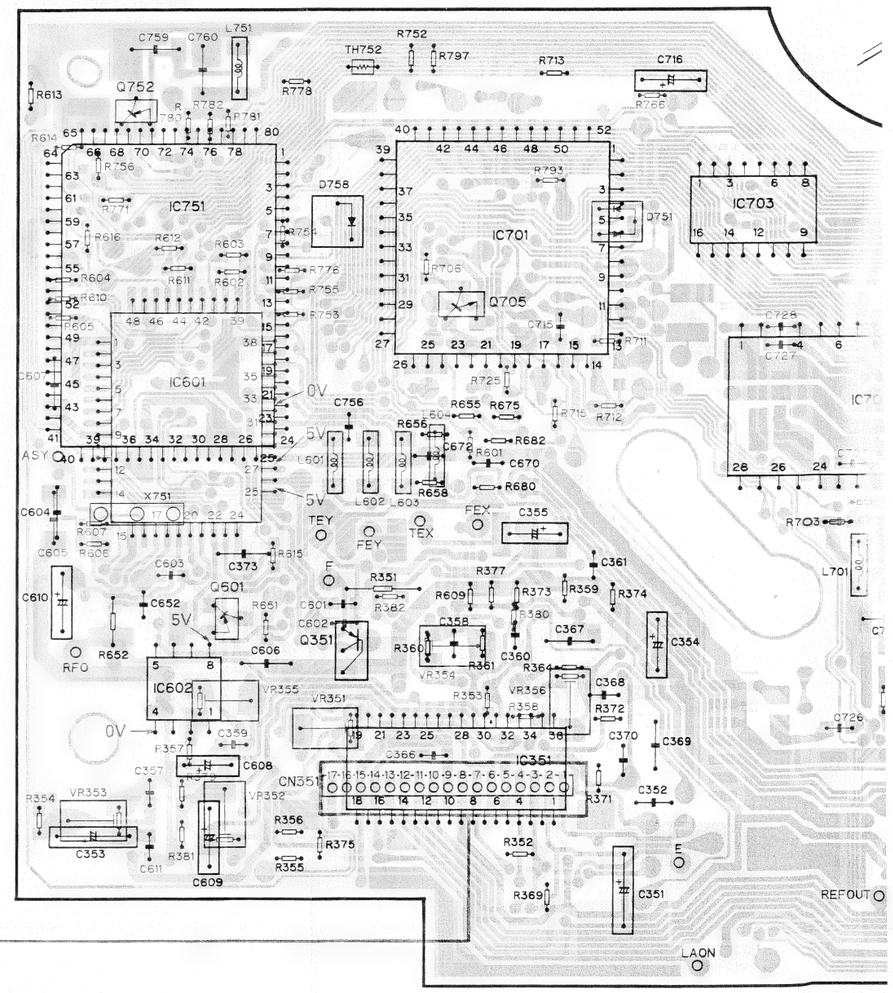

Fig. 5

• CD Mechanism Module

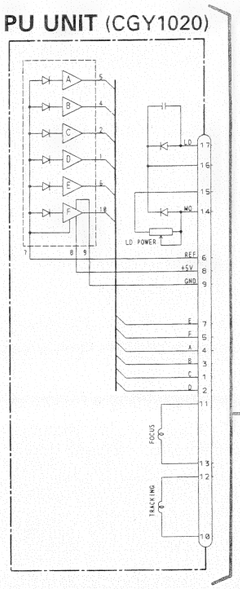
## SWITCH P. C. BOARD



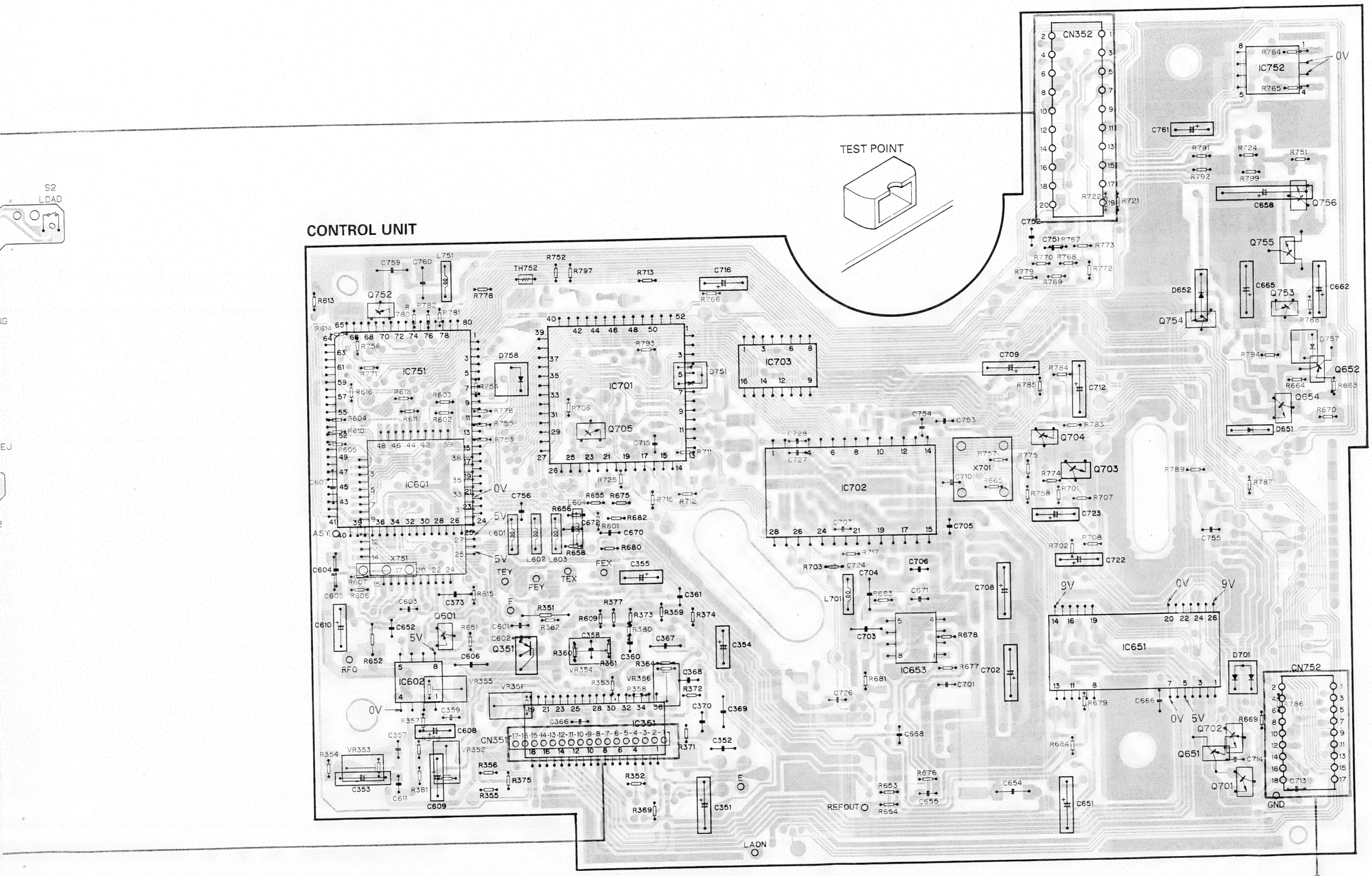

## CONTROL UNIT




## PU UNIT (CGY1020)



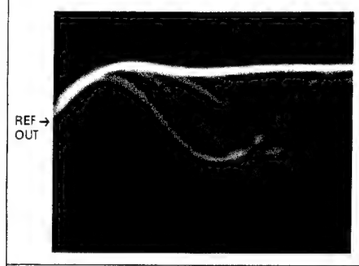
## CONTROL UNIT


S2
LOAD
TEST POINT
CN352
IC752
R764
R765
0V
C761
R791
R792
R724
R799
R751
C658
Q756
Q755
C752
C751
R767
R773
R770
R768
R772
R779
R769
D652
Q754
C665
Q753
C662
R788
D757
R794
Q652
R664
R663
Q654
R670
D651
C709
R784
R785
C712
R783
Q704
C754
C753
C728
C727
IC702
X701
C710
R665
R757
R775
R774
Q703
R758
R701
R707
C723
R789
R787
C705
R702
R708
C722
C755
R703
C724
C704
C706
C708
L701
R683
C671
9V
0V
9V
IC651
D701
CN752
C703
IC653
R678
R677
C702
C701
R681
C726
C666
C786
0V
5V
R669
Q702
Q651
C714
Q701
C713
GND
C668
R684
R676
R653
C655
C654
C651
REFOUT
R654
IC751
R613
R614
R616
R612
R603
R611
R602
R604
R610
R605
R606
C604
C605
C610
C603
C652
R652
RFO
IC601
X751
C607
R607
R615
C373
Q601
R651
5V
C606
IC602
VR355
VR351
0V
C359
R357
C608
C609
C611
R381
VR353
R354
C353
C357
VR352
R356
R355
R375
CN351
C366
IC351
R371
C352
C369
C370
R372
C368
R374
C354
R359
R373
R377
C361
R380
C367
R358
VR356
R353
C358
R360
VR354
R361
R364
C360
R362
R351
C602
Q351
C601
R609
F
FEX
TEX
FEY
TEY
5V
L602
L603
L604
L601
C756
R656
R658
R655
R675
R715
R712
R682
C676
R601
C670
R680
C355
R725
C715
R711
R706
Q705
D751
R793
IC703
IC701
D758
R755
R778
R753
R754
R752
R797
R713
C716
R766
TH752
C759
C760
L751
Q752
R778
R782
R780
R781
R756
R771
R616
R613
R603
R611
R602
R604
R610
R605
48 46 44 42 39
IC601
0V
5V
ASY
X751
R607
R606
C604
C605
C610
C603
C652
R652
RFO

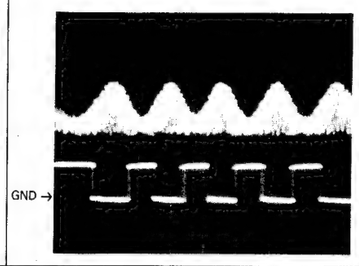
## • Wave Forms

Note: 1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFOUT: 2.5V

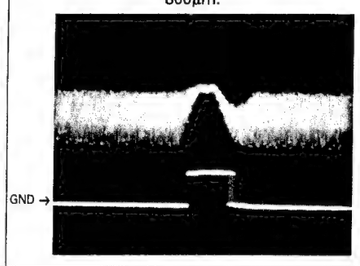
① RFO 0.5V/div. 0.2µs/div.
Normal mode: play



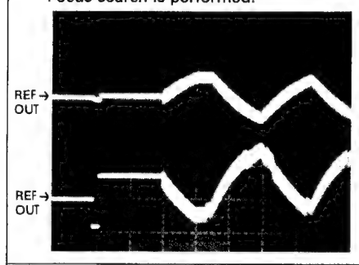

① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Test mode: Tracking open



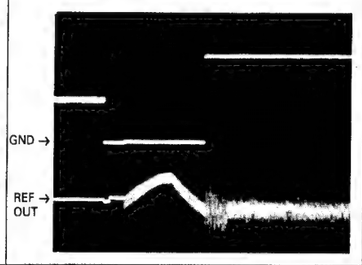

① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Normal mode: The defect part passes 800µm.



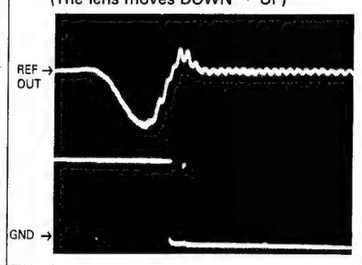

③ CH1: FIN 1V/div.
④ CH2: FO 2V/div. 0.5s/div.
Test mode: Connect the FEX to REFOUT.
Focus search is performed.




⑤ CH1: FOK 2V/div.
③ CH2: FIN 1V/div. 0.5s/div.
Normal mode: Focus close

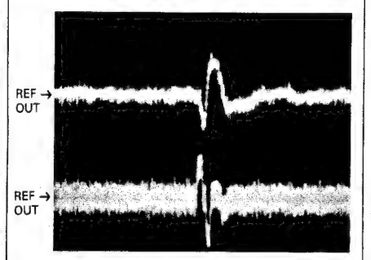



⑥ CH1: FEY 1V/div.
⑦ CH2: XSO 2V/div. 2ms/div.
Normal mode: Focus close
(The lens moves DOWN → UP)

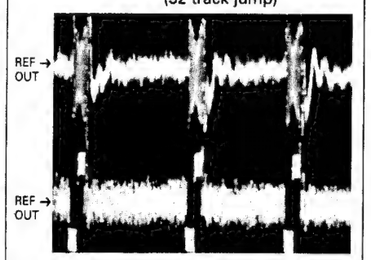



⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Normal mode: Brake wave from when track search is performed.

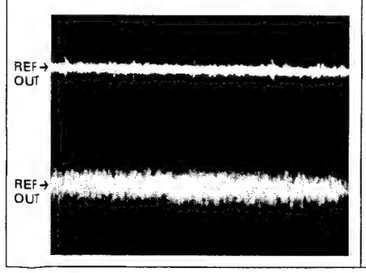
⑧ CH1: TEY 1V/div.
⑨ CH2: TIN 0.5V/div. 1ms/div.
Normal mode: single jump



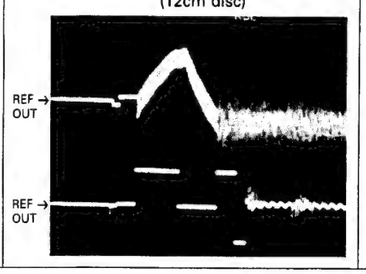

⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 5ms/div.
Normal mode: Track search
(32 track jump)



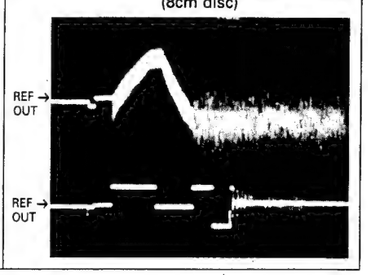

⑥ CH1: FEY 0.2V/div.
③ CH2: FIN 0.5V/div. 20ms/div.
Normal mode: Play




③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus search
(12cm disc)

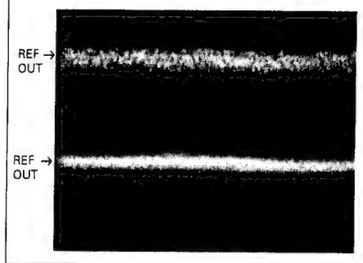



③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus search
(8cm disc)

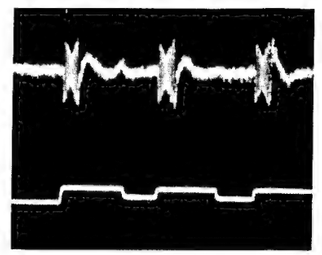




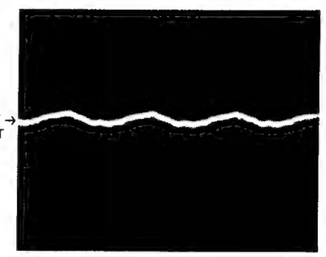

⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 20ms/div.
Normal mode: Play



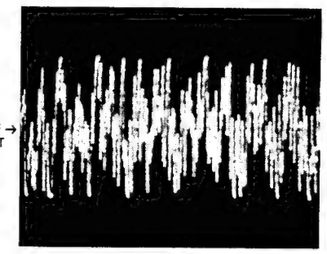

⑧ CH1: TEY 0.5V/div.
㉓ CH2: CIN 1V/div. 5ms/div.
Normal mode: Search



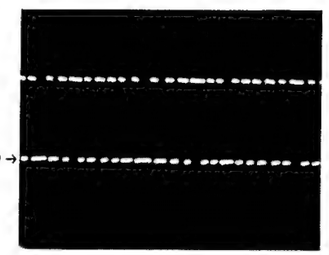
⑩ SIN 0.5V/div. 50ms/div.
Normal mode: Play (12cm disc)



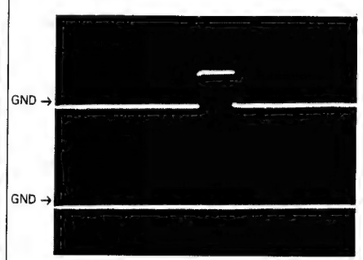

⑩ SIN 0.5V/div. 10ms/div.
Search (12cm disc)



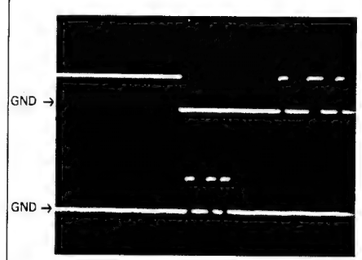

⑪ EFM 2V/div. 5µs/div.
Play



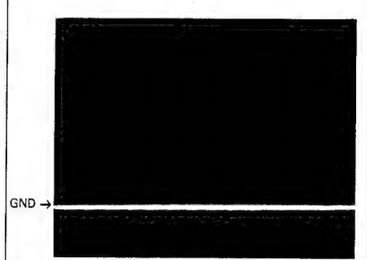

⑫ CH1: MDF 5V/div.
⑬ CH2: MDR 5V/div. 2ms/div.
Play



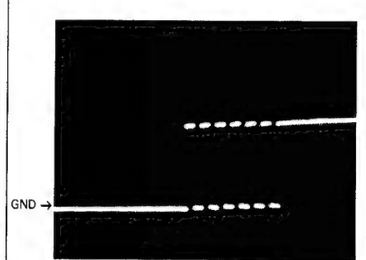

⑫ CH1: MDF 5V/div.
⑬ CH2: MDR 5V/div. 10ms/div.
Search



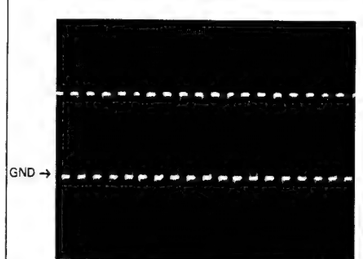

⑭ FLAG 2V/div. 0.1ms/div.
Play



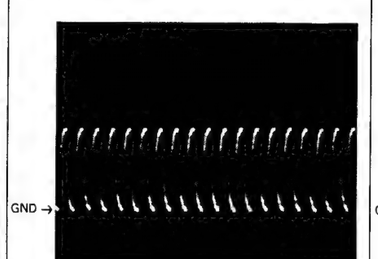

⑭ FLAG 2V/div. 0.1ms/div.
Search




⑮ PLCK 2V/div. 0.5µs/div.
Play

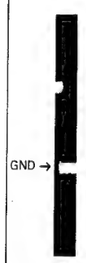



⑯ SCKO 2V/div. 1µs/div.
Play

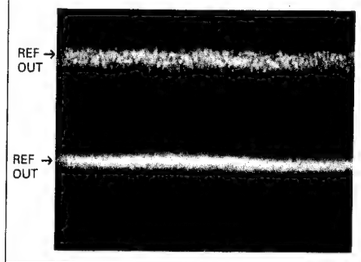



⑰ Dout 2v/div. 10µs/div.
Play

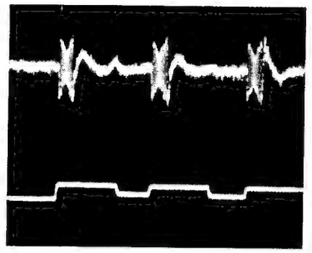
⑱ LRC
Play



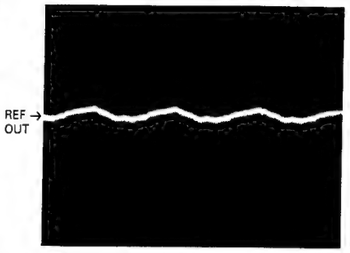
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 20ms/div.
Normal mode: Play



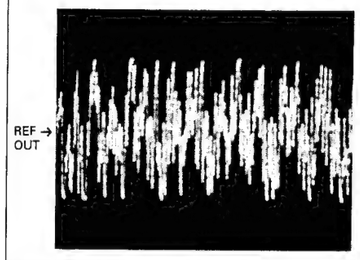

⑧ CH1: TEY 1V/div. 5ms/div.
㉓ CH2: CIN
Normal mode: Search



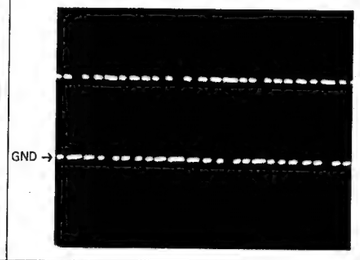
⑩ SIN 0.5V/div. 50ms/div.
Normal mode: Play (12cm disc)



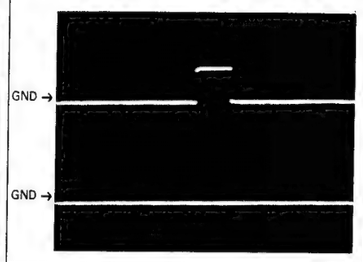

⑩ SIN 0.5V/div. 10ms/div.
Search (12cm disc)



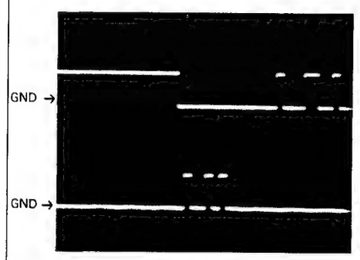

⑪ EFM 2V/div. 5µs/div.
Play



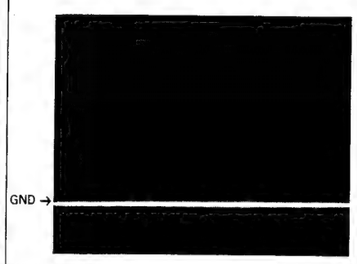

⑫ CH1: MDF 5V/div.
⑬ CH2: MDR 5V/div. 2ms/div.
Play



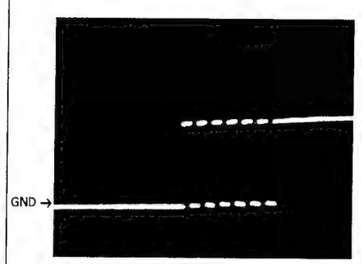

⑫ CH1: MDF 5V/div.
⑬ CH2: MDR 5V/div. 10ms/div.
Search



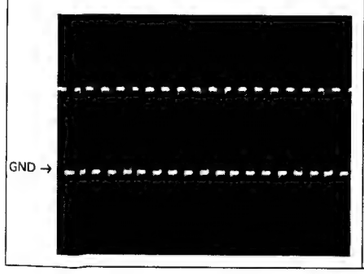

⑭ FLAG 2V/div. 0.1ms/div.
Play



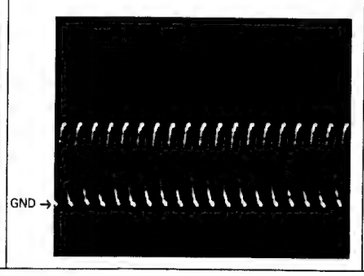

⑭ FLAG 2V/div. 0.1ms/div.
Search



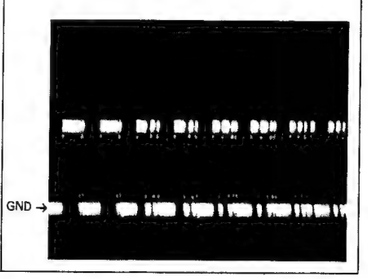

⑮ PLCK 2V/div. 0.5µs/div.
Play




⑯ SCKO 2V/div. 1µs/div.
Play

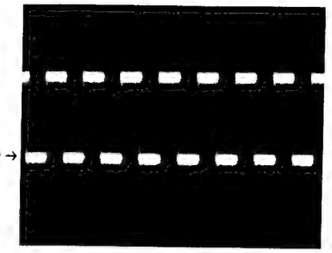



⑰ Dout 2v/div. 10µs/div.
Play

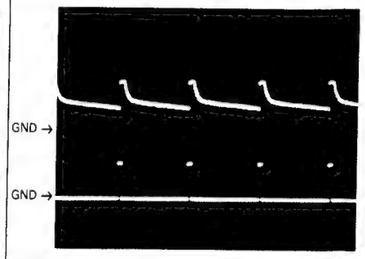




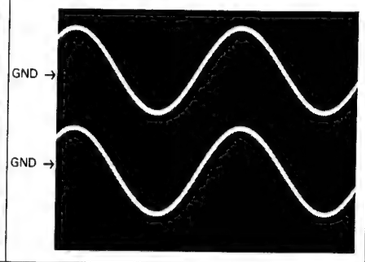

⑱ LRCK 2V/div. 20µs/div.
Play




⑲ CH1: VM 5V/div.
⑳ CH2: VMC 5V/div. 50ms/div.
Normal mode: No disc




㉑ CH1: Lout 1V/div.
㉒ CH2: Rout 1V/div. 0.2ms/div.
Play (1kHz)



## • FM/AM Unit (DEH-M980RDS/EW,X1B)

## FM/AM Unit (CWE1238)(DEH-M980RDS/EW,X1B)

FM/AM UNIT IC201

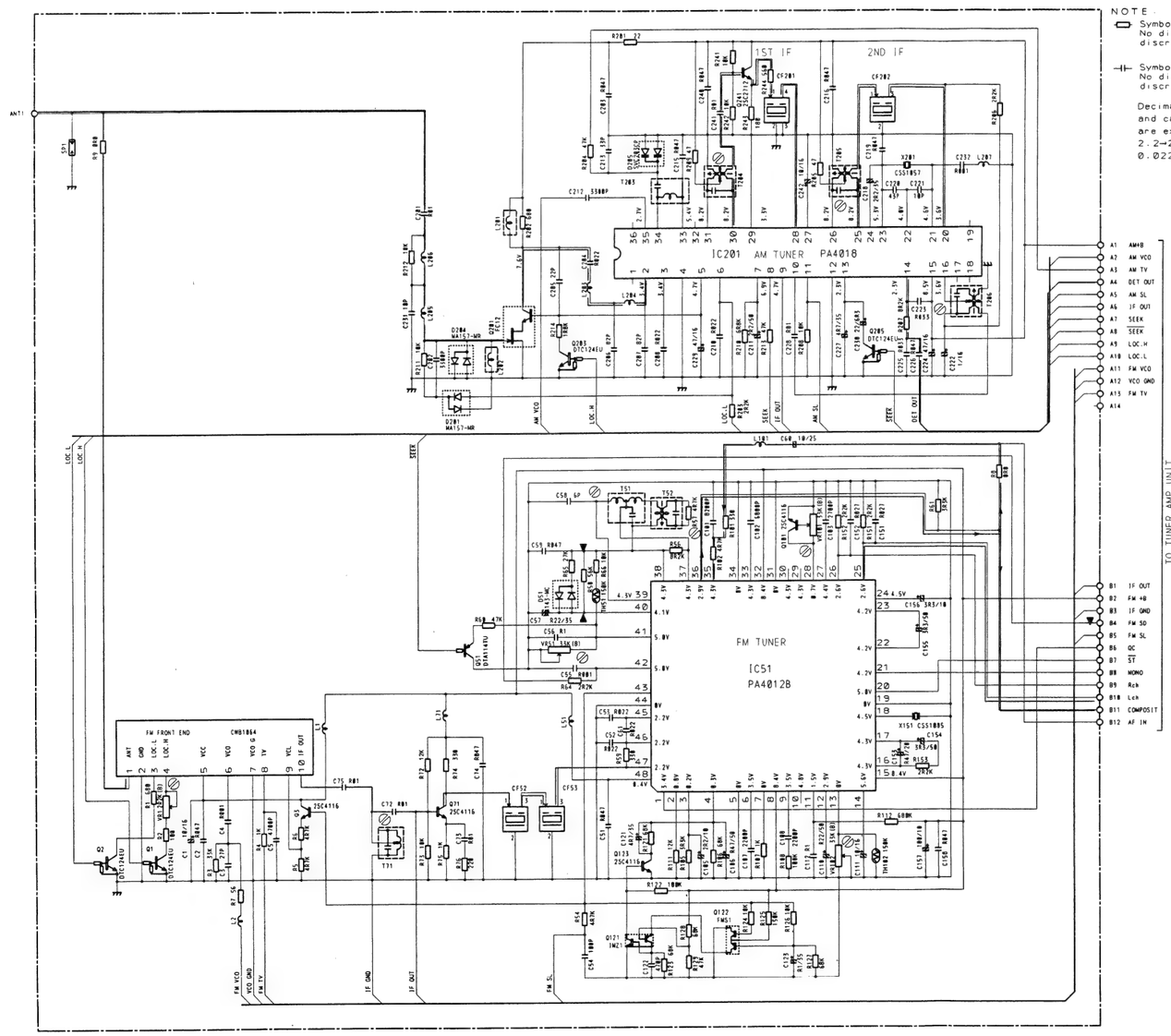
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| 3.4V | 3.4V | 0V | 4.7V | | | 6.9V | 4.7V |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| | 0V | 2.3V | 2.3V | 8.5V | 3.6V | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| | 3.6V | 4.6V | 4.0V | 5.3V | 8.2V | | |
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| 3.3V | 0V | 8.2V | 8.2V | 5.4V | | | 2.1V |

NOTE

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as
2.2→2R2
0.022→R022




IC, Q Q205 IC201 Q241 Q201 Q203 Q1
ADJ T206 T205 T204 T203

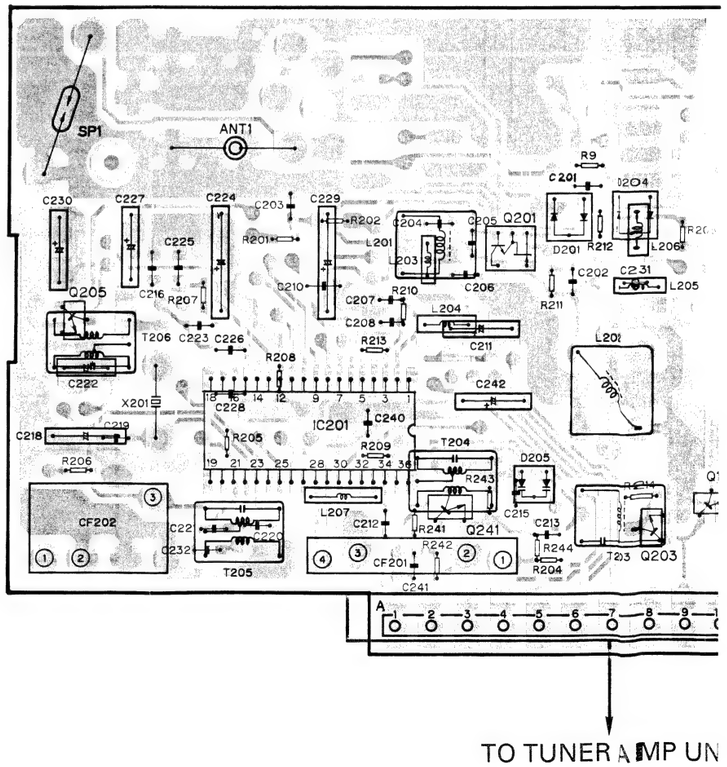



Fig. 53

NOTE:
- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

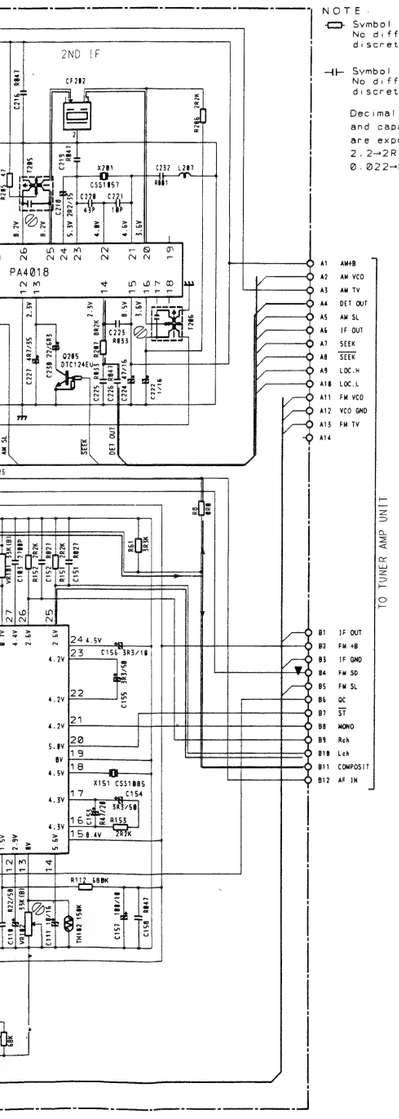



Fig. 53

FM/AM UNIT IC201

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 3.4V | 3.4V | 0V | 4.7V | | | 6.9V | 4.7V | |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | 0V | 2.3V | 2.3V | 8.5V | 3.6V | | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| | 3.6V | 4.6V | 4.0V | 5.3V | 8.2V | | | |
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 3.3V | 0V | 8.2V | 8.2V | 5.4V | | | 2.1V | |

FM/AM UNIT IC51

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| 3.4V | 0.8V | 0.2V | 0.3V | 0V | 3.5V | 0V | 8.4V |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 3.5V | 4.8V | 1.5V | 2.9V | 0V | 5.6V | 8.4V | 4.3V |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 4.3V | 4.5V | 0V | 5.0V | 4.2V | 4.2V | 4.2V | 4.5V |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 2.6V | 2.6V | 4.4V | 0.7V | 4.3V | 4.3V | 0V | 8.4V |
| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 4.3V | 0V | 4.3V | 2.9V | 4.3V | 4.3V | 4.3V | 4.1V |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| 5.0V | 5.0V | 0V | 2.2V | 2.2V | 2.2V | 0.4V | |

IC, Q Q205 IC201 Q241 Q201 Q203 Q1 Q2 Q122 Q121 Q123 Q3 Q51 Q71 IC51 Q101
ADJ T206 T205 T204 T203 VR1 T71 T51 VR51 T52 VR101 VR102

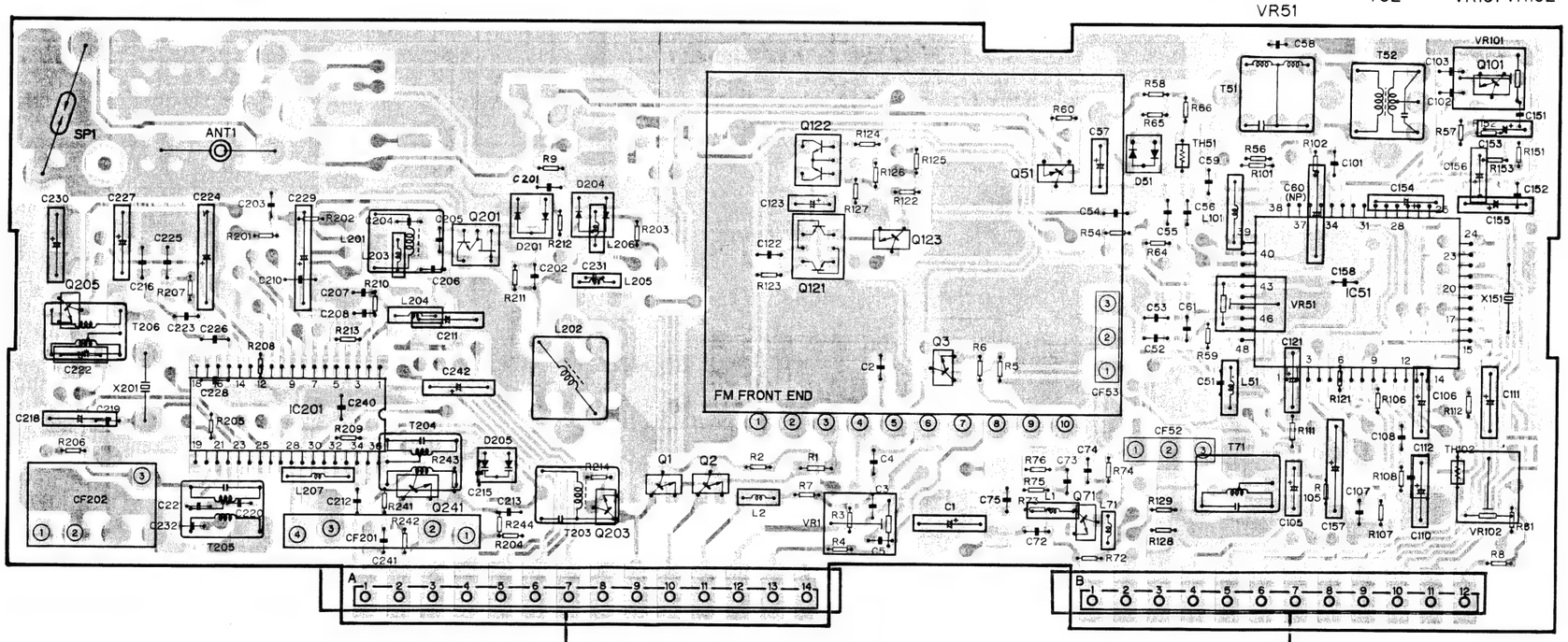



Fig. 54

## • FM/AM Unit (DEH-M980/UC,M940/ES,M77/US)

## FM/AM Unit (CWE1240)

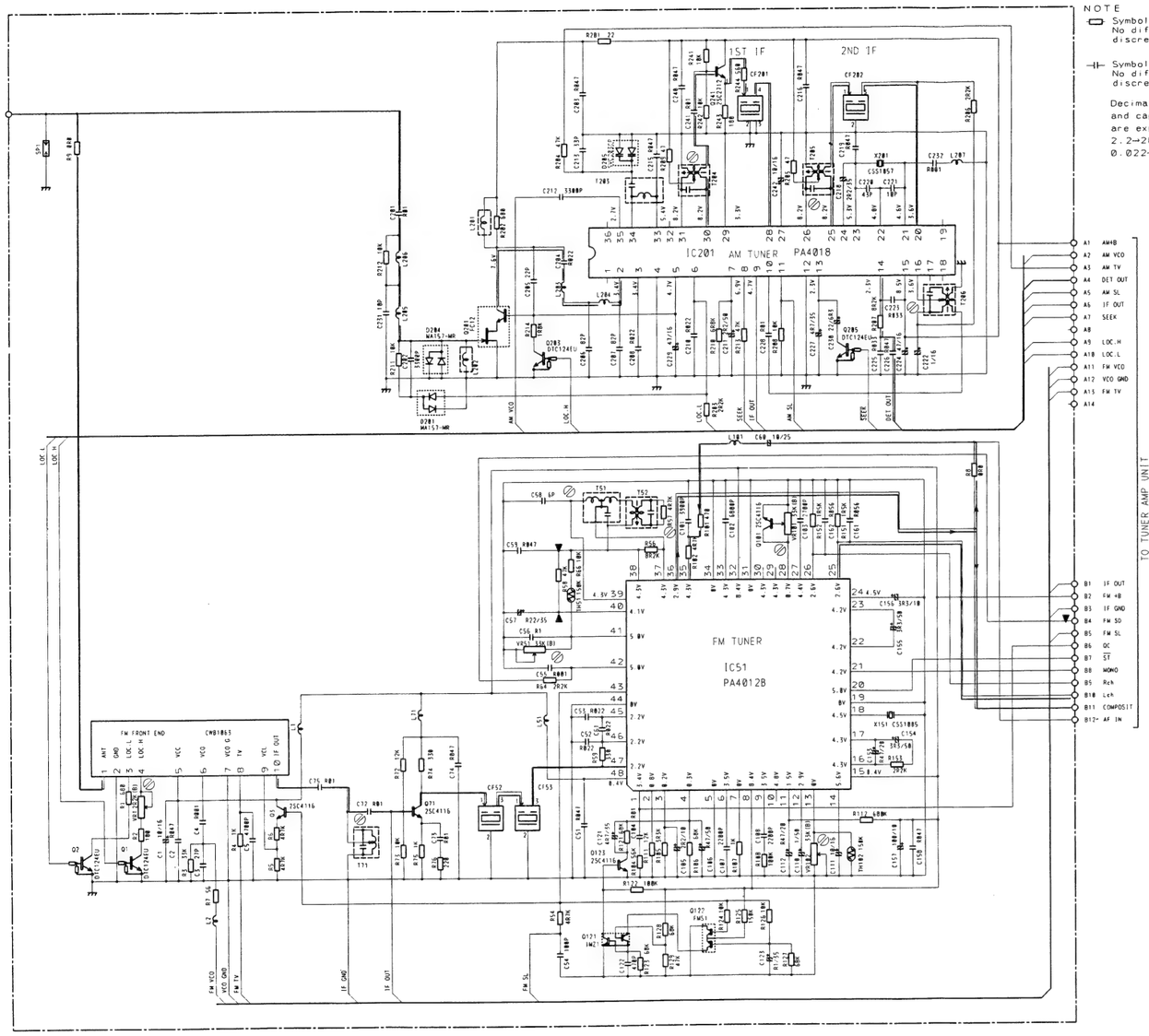
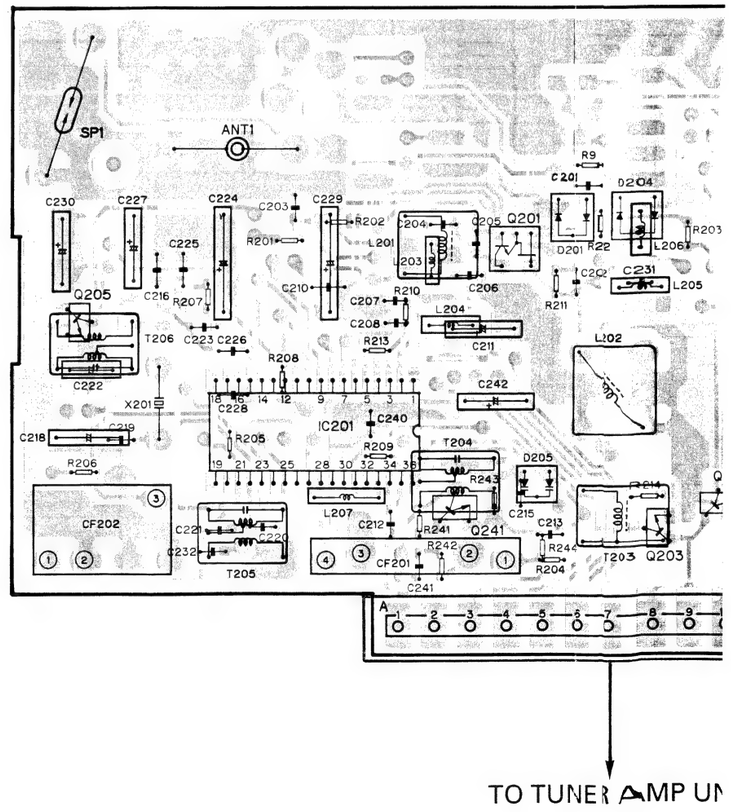



Fig. 55

FM/AM UNIT IC201

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 3.4V | 3.4V | 0V | 4.7V | | | 6.9V | 4.7V | |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | 0V | 2.3V | 2.3V | 8.5V | 3.6V | | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| | 3.6V | 4.6V | 4.0V | 5.3V | 8.2V | | | |
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 3.3V | 0V | 8.2V | 8.2V | 5.4V | | | 2.1V | |

IC, Q Q205 IC201 Q241 Q201 Q203 Q1
ADJ T206 T205 T204 T203



NOTE

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as
2.2→2R2
0.022→R022

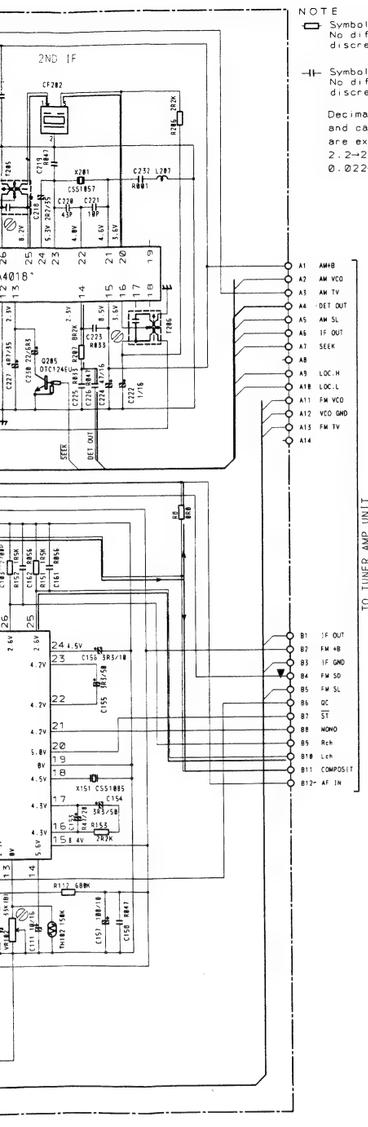



Fig. 55

FM/AM UNIT IC201

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 3.4V | 3.4V | 0V | 4.7V | | | 6.9V | 4.7V | |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | 0V | 2.3V | 2.3V | 8.5V | 3.6V | | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| | 3.6V | 4.6V | 4.0V | 5.3V | 8.2V | | | |
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 3.3V | 0V | 8.2V | 8.2V | 5.4V | | | 2.1V | |

FM/AM UNIT IC51

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| 3.4V | 0.8V | 0.2V | 0.3V | 0V | 3.5V | 0V | 8.4V |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 3.5V | 4.8V | 1.5V | 2.9V | 0V | 5.6V | 8.4V | 4.3V |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 4.3V | 4.5V | 0V | 5.0V | 4.2V | 4.2V | 4.2V | 4.5V |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 2.6V | 2.6V | 4.4V | 0.7V | 4.3V | 4.3V | 0V | 8.4V |
| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 4.3V | 0V | 4.3V | 2.9V | 4.3V | 4.3V | 4.3V | 4.1V |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| 5.0V | 5.0V | 0V | 2.2V | 2.2V | 2.2V | 0.4V | |

IC. Q Q205 IC201 Q241 Q201 Q203 Q1 Q2 Q122 Q121 Q123 Q3 Q71 IC51 Q101

ADJ T206 T205 T204 T203 VR1 T71 T51 VR51 T52 VR101 VR102

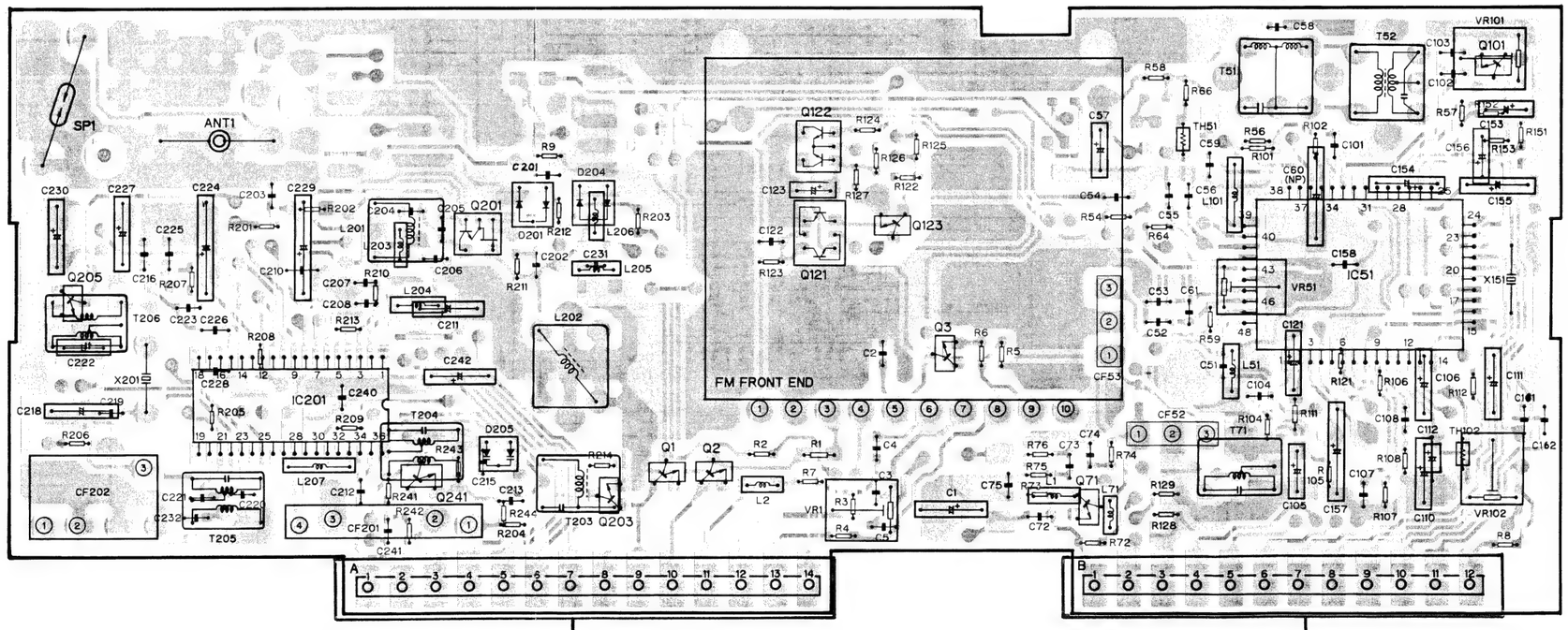
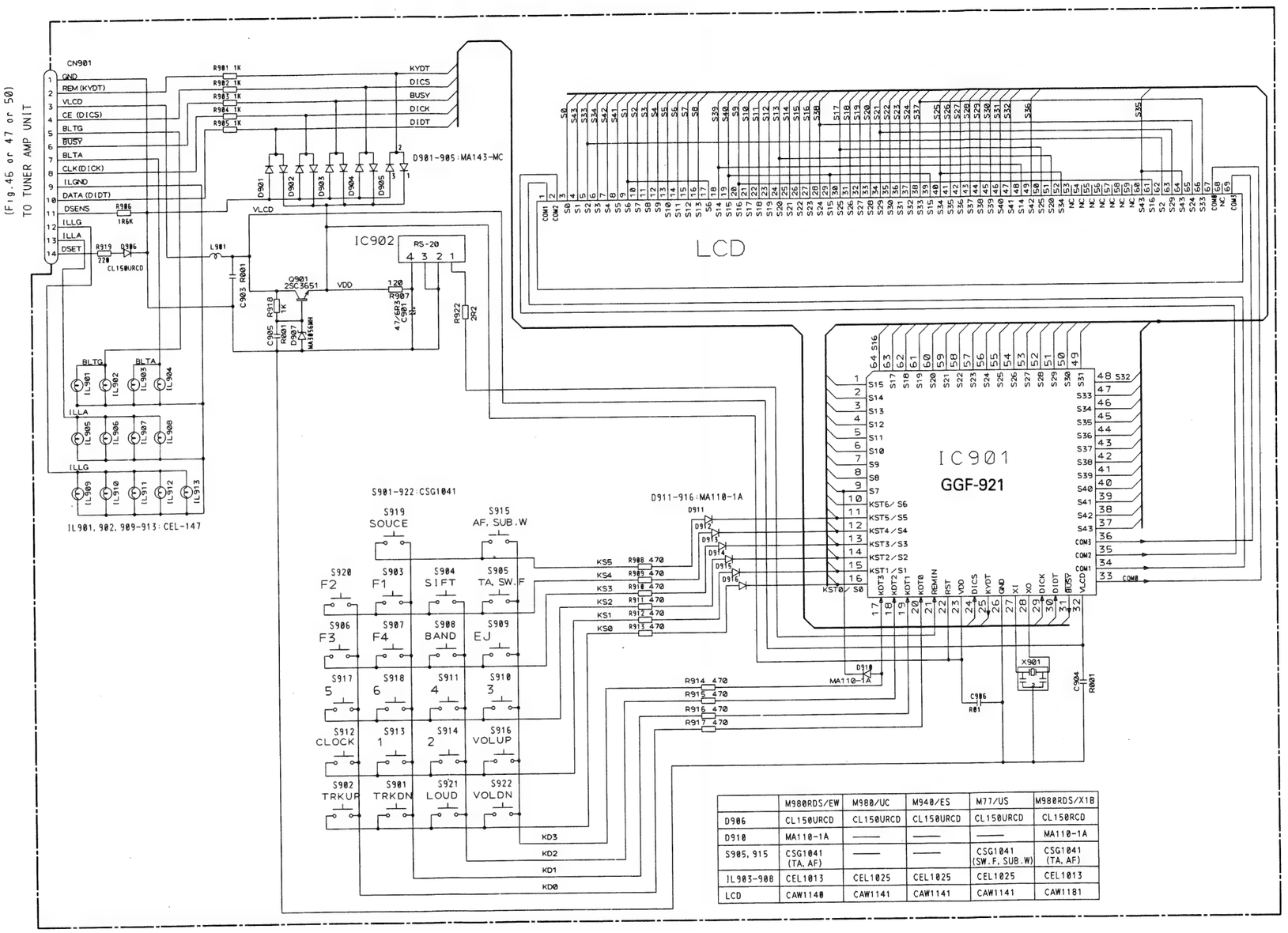



Fig. 56

## • Display Unit




| | M980RDS/EW | M980/UC | M940/ES | M77/US | M980RDS/X1B |
|---|---|---|---|---|---|
| D906 | CL150URCD | CL150URCD | CL150URCD | CL150URCD | CL150RCD |
| D910 | MA110-1A | —— | —— | —— | MA110-1A |
| S905, 915 | CSG1041 (TA, AF) | —— | —— | CSG1041 (SW.F, SUB.W) | CSG1041 (TA, AF) |
| IL903-908 | CEL1013 | CEL1025 | CEL1025 | CEL1025 | CEL1013 |
| LCD | CAW1140 | CAW1141 | CAW1141 | CAW1141 | CAW1181 |

Fig. 57

Fig. 57

IC, Q IC901 Q901 IC902

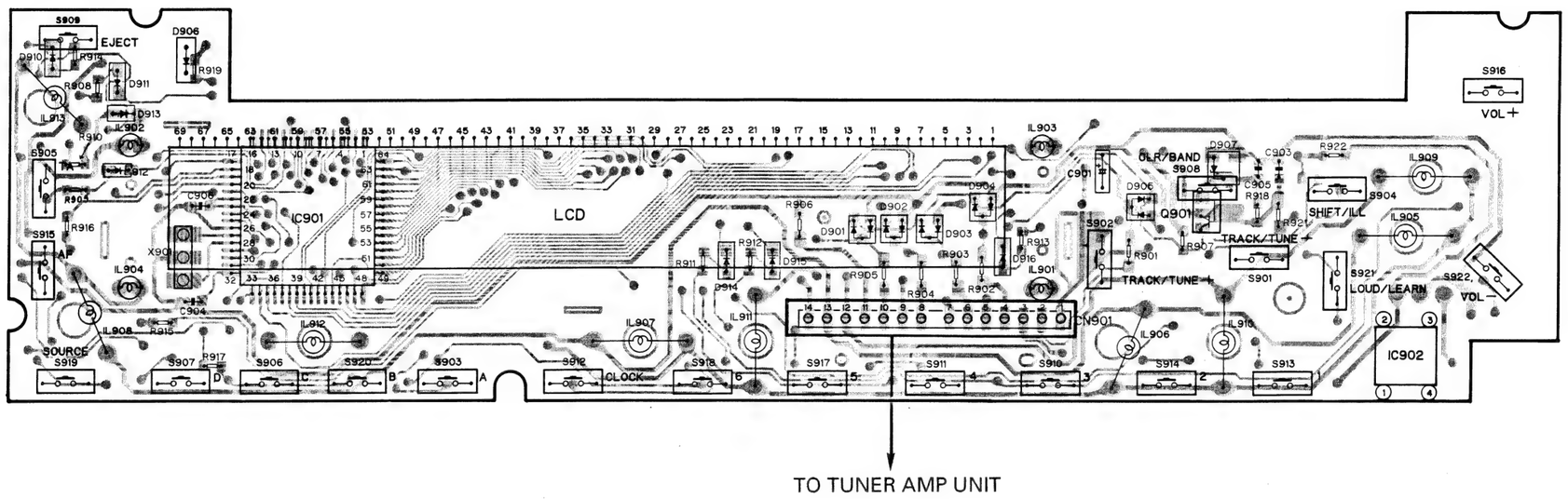



Fig. 58

# 12. CD MECHANISM MODULE EXPLODED VIEW

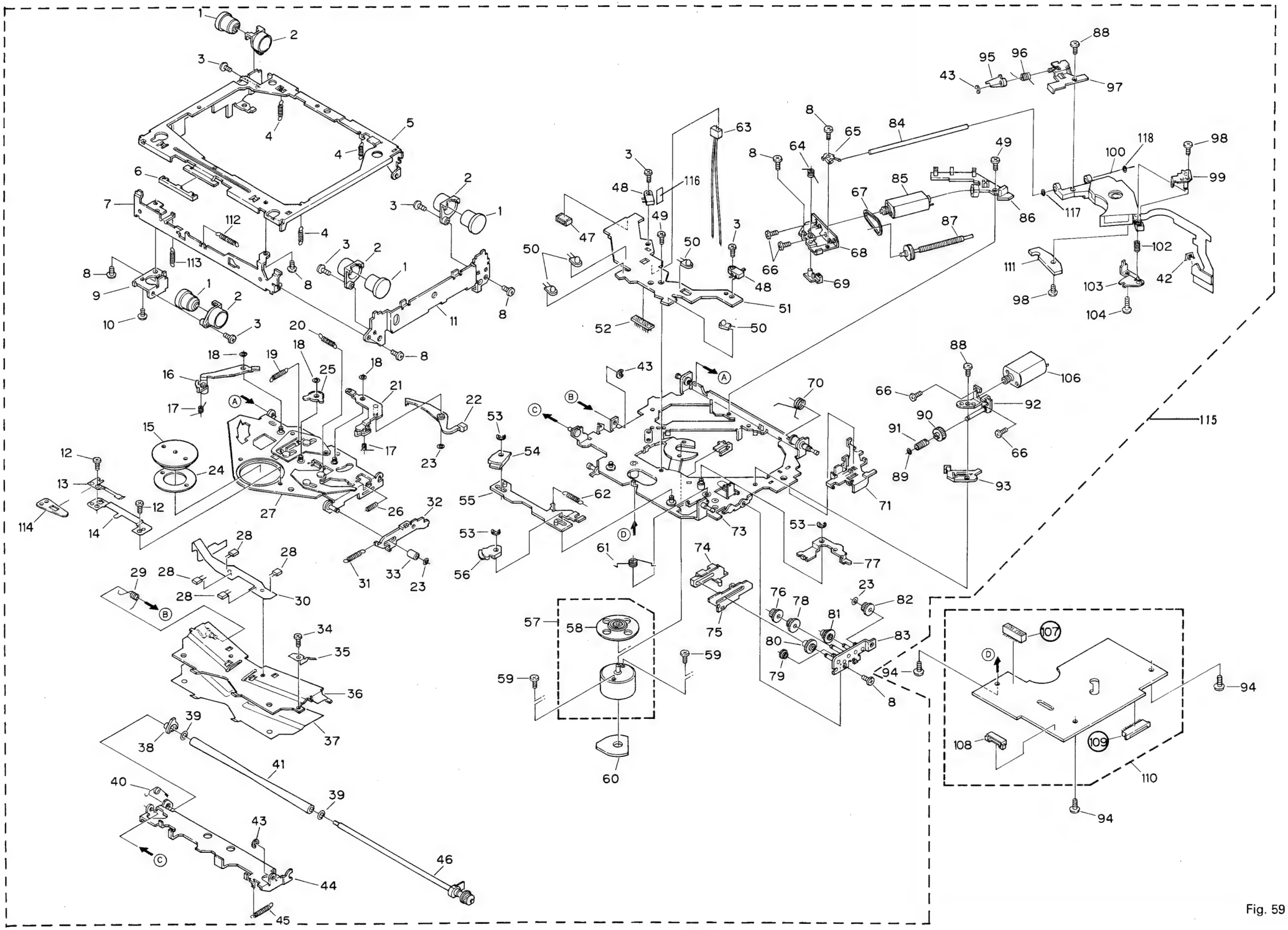


Fig. 59

## • Parts List

*NOTE:*

- *The parts m*
- *subject to re*
- *Because the*
- *not spare pa*

| Mark | No. | Descr |
|---|---|---|
| | 1 | Dampe |
| | 2 | Holde |
| | 3 | Screw |
| | 4 | Sprin |
| | 5 | Frame |
| | 6 | Guide |
| | 7 | Frame |
| | 8 | Screw |
| | 9 | Brack |
| | 10 | Screw |
| | 11 | Frame |
| | 12 | Screw |
| | 13 | Spri |
| | 14 | Brac |
| | 15 | Clamp |
| | 16 | Arm U |
| | 17 | Sprin |
| | 18 | Washe |
| | 19 | Sprin |
| | 20 | Sprin |
| | 21 | Arm U |
| | 22 | Arm |
| | 23 | Washe |
| | 24 | Sheet |
| | 25 | Gear |
| | 26 | Sprin |
| | 27 | Arm U |
| | 28 | Photo |
| | 29 | Sprin |
| | 30 | P.C.B |
| | 31 | Sprin |
| | 32 | Lever |
| | 33 | Rolle |
| | 34 | Screw |
| | 35 | Sprin |
| | 36 | Arm U |
| | 37 | Sheet |
| | 38 | Holde |
| | 39 | Washe |
| | 40 | Sprin |

## • Parts List

*NOTE:*

- *The parts marked with "◉" may need long time to supply and their supply is subject to refuse as the case may be.*
- *Because the parts with encircled number shown on the dismantling drawing are not spare parts, we are unable to supply them in principle.*

| Mark No. | Description | Part No. | Mark No. | Description | Part No. |
|---|---|---|---|---|---|
| 1 | Damper | CNV2882 | 41 | Roller | CNV2225 |
| 2 | Holder | CNV2863 | 42 | Short Pin | CBL1010 |
| 3 | Screw | CBA1004 | 43 | Washer | YE15FUC |
| 4 | Spring | CBH1417 | 44 | Arm | CNC3819 |
| 5 | Frame | CNC3816 | 45 | Spring | CBH1421 |
| 6 | Guide | CNV2891 | 46 | Gear Unit | CXA4265 |
| 7 | Frame | CNC3835 | 47 | Connector (4P) | CKS2088 |
| 8 | Screw | BMZ20P030FMC | 48 | Switch (S1, 2) | CSN1012 |
| 9 | Bracket | CNC3818 | 49 | Screw | CBA1077 |
| 10 | Screw | BMZ20P040FNI | 50 | LED (D1-4) | BR4361F |
| 11 | Frame | CNC3817 | 51 | Gathering P. C. Board | CNX1759 |
| 12 | Screw | JFZ20P018FNI | 52 | Connector (16P) | CKS2064 |
| 13 | Spring | CBL1131 | 53 | Washer | YE20FUC |
| 14 | Bracket | CNC3830 | 54 | Arm | CNV2884 |
| 15 | Clamper | CNV2864 | 55 | Lever Unit | CXA4269 |
| 16 | Arm Unit | CXA4271 | 56 | Arm | CNV2885 |
| 17 | Spring | CBH1415 | 57 | Motor (Spindle) | CXM1058 |
| 18 | Washer | CBF1039 | 58 | Support Wheel | CNV2859 |
| 19 | Spring | CBH1418 | 59 | Screw | HBA-258 |
| 20 | Spring | CBH1419 | 60 | P. C. Board | CNP2720 |
| 21 | Arm Unit | CXA4272 | 61 | Spring | CBH1414 |
| 22 | Arm | CNV2876 | 62 | Spring | CBH1424 |
| 23 | Washer | CBF1038 | 63 | Connector (2P) | CDE3369 |
| 24 | Sheet | CNM3110 | 64 | Spring | CBH1410 |
| 25 | Gear | CNV2875 | 65 | Spring | CBL1129 |
| 26 | Spring | CBH1423 | 66 | Screw | JFZ20P025FMC |
| 27 | Arm Unit | CXA4259 | 67 | Belt | CNT1047 |
| 28 | Photo-transistor | PT4800 | 68 | Bracket | CNC3832 |
| 29 | Spring | CBH1449 | 69 | Holder | CNV2878 |
| 30 | P. C. Board | CNP2718 | 70 | Spring | CBH1413 |
| 31 | Spring | CBH1420 | 71 | Cover | CNV2889 |
| 32 | Lever | CNC3828 | 72 | Holder | CNV3023 |
| 33 | Roller | CLA1936 | 73 | Chassis Unit | CXA4258 |
| 34 | Screw | JFZ20P018FNI | 74 | Lever | CNV2874 |
| 35 | Spring | CBL1130 | 75 | Lever | CNC3824 |
| 36 | Arm Unit | CXA4263 | 76 | Gear | CNV2871 |
| 37 | Sheet | CNM3111 | 77 | Arm | CNC3833 |
| 38 | Holder | CNV2866 | 78 | Gear | CNV2872 |
| 39 | Washer | HBF-132 | 79 | Gear | CNV2883 |
| 40 | Spring | CBH1412 | 80 | Gear | CNV2873 |



| Mark No. | Description | Part No. | Mark No. | Description | Part No. |
|---|---|---|---|---|---|
| 81 | Gear | CNV2870 | 101 | ····· | |
| 82 | Gear | CNV2869 | 102 | Spring | CBH1422 |
| 83 | Bracket Unit | CXA4261 | 103 | Holder | CNC4306 |
| 84 | Shaft | CLA2027 | 104 | Screw | JGZ20P070FNI |
| 85 | Motor Unit (Carriage) | CXA4649 | 105 | ····· | |
| 86 | Holder | CNV2888 | 106 | Motor Unit (Loading) | CXA4267 |
| 87 | Screw Unit | CXA4266 | 107 | Connector (CN352) | CKS2063 |
| 88 | Screw | CBA1082 | 108 | Connector (CN752) | CKS2149 |
| 89 | Washer | CBF1054 | 109 | Connector (CN351) | CKS2121 |
| 90 | Gear | CNV2892 | 110 | Control Unit | CWX1454 |
| 91 | Gear | CNV2868 | 111 | Weight | CNC4116 |
| 92 | Bracket Unit | CXA4262 | 112 | Spring | CBH1458 |
| 93 | Holder | CNV2887 | 113 | Spring | CBH1457 |
| 94 | Screw | PMSZ6P040FMC | 114 | Spacer | CNM3315 |
| 95 | Rack | CNV2879 | ◉ 115 | CD Mechanism Unit | CXA4260 |
| 96 | Spring | CBH1411 | 116 | Cushion | CNT1057 |
| 97 | Bracket Unit | CXA4264 | 117 | Washer | CBF1055 |
| 98 | Screw | JFZ17P030FNI | 118 | Cushion | CNT1058 |
| 99 | Holder Unit | CXA4606 | | | |
| 100 | PU Unit | CGY1020 | | | |

# 13. PACKING METHOD

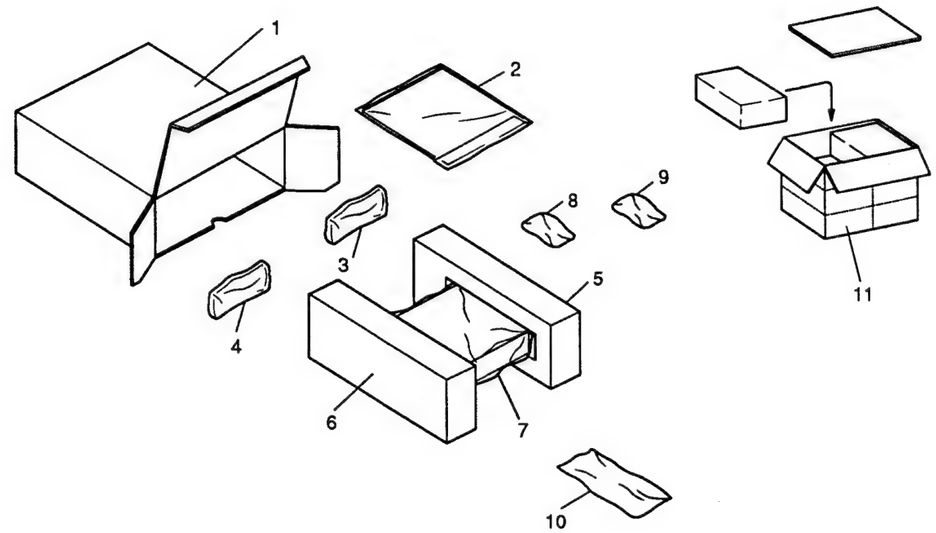



Fig. 60

## • Parts List

*:Non spare part

| Mark No. | Description | M980RDS/EW Part No. | M980/UC Part No. | M940/ES Part No. | M77/US Part No. | M980RDS/X1B Part No. |
|---|---|---|---|---|---|---|
| 1 | Carton | CHG2161 | CHG2165 | CHG2167 | CHG2164 | CHG2179 |
| 2-1 | Owner's Manual | CRD1521 | CRD1519 | CRD1520 | CRB1223 | CRD1563 |
| 2-2 | Owner's Manual | CRD1522 | ····· | ····· | ····· | ····· |
| * 2-3 | Card | CRY-062 | ARY1048 | ····· | ARY1048 | CRY-063 |
| * 2-4 | Caution Card | CRN1007 | ····· | ····· | ····· | CRN1007 |
| * 2-5 | Passport | CRY1013 | ····· | ····· | ····· | CRY1014 |
| 2-6 | Polyethylene Bag | E36-618 | E36-618 | E36-618 | E36-618 | E36-618 |
| 3 | Cord | CDE3268 | CDE3477 | CDE3677 | CDE3477 | CDE3268 |
| 4 | Case | CNS2269 | CNS2269 | CNS2269 | CNS2269 | CNS2269 |
| 5 | Styrofoam | CHP1463 | CHP1463 | CHP1463 | CHP1463 | CHP1467 |
| 6 | Styrofoam | CHP1462 | CHP1462 | CHP1462 | CHP1462 | CHP1466 |
| 7 | Cover | CEG1092 | CEG1092 | CEG1092 | CEG1092 | CEG-173 |
| 8 | Remote Control Assy | CXA4419 | CXA4421 | CXA4419 | CXA4420 | CXA4419 |
| * 9-1 | Battery | CEX1006 | CEX1006 | CEX1006 | CEX1006 | CEX1006 |
| 9-2 | Fastener(Rough) | CNM3249 | CNM3249 | CNM3249 | CNM3249 | CNM3249 |
| 9-3 | Fastener(Soft) | CNM3250 | CNM3250 | CNM3250 | CNM3250 | CNM3250 |
| * 9-4 | Polyethylene Bag | CEG-127 | CEG-127 | CEG-127 | CEG-127 | CEG-127 |
| 10 | Accessory Assy | CEA1692 | CEA1692 | CEA1692 | CEA1692 | CEA1700 |
| 11 | Contain Box | *CHL2161 | CHL2165 | *CHL2167 | CHL2164 | ····· |

| 10 | Accessory Assy | CEA1692 | CEA1700 |
|---|---|---|---|
| Mark No. | Description | Part No. | Part No. |
| * 10-1 | Screw Assy | CEA1105 | CEA1702 |
| 10-1-1 | Screw(×1) | CBA-102 | CBA-102 |
| 10-1-2 | Screw(×1) | CBA1002 | CBA1002 |
| 10-1-3 | Nut(×2) | NF50FMC | NF50FMC |
| *10-1-4 | Polyethylene Bag | CEG-127 | CEG-127 |
| 10-2 | Handle | CNC1631 | CNC1631 |
| 10-3 | Strap | CNF-111 | CNC2840 |
| 10-4 | Bush | CNV1917 | CNV1917 |
| * 10-5 | Polyethylene Bag | CEG-158 | CEG1041 |

2-1, 2-2 Owner's Manual

| Part No. | Model | Language |
|---|---|---|
| CRD1521 | DEH-M980RDS/EW | English, French, German, Spanish |
| CRD1522 | DEH-M980RDS/EW | Swedish, Norwegian, Dutch, Italian, Finnish |
| CRD1519 | DEH-M980/UC | English, French |
| CRD1520 | DEH-M940/ES | English, French, Spanish, Arabic |
| CRB1223 | DEH-M77/US | English |
| CRD1563 | DEH-M980RDS/X1B | English, French, German, Dutch, Italian |

# 14. CHASSIS EXPLODED VIEW

• Parts List (DEH-M980RDS/EW)

| Mark | No. | Description | Part No. | Mark | No. | Description | Part No. |
|---|---|---|---|---|---|---|---|
| | 1 | Battery Cover | CNS2197 | | 46 | Arm | CNV2743 |
| | 2 | Remote Control Assy | CXA4419 | | 47 | Arm Unit | CXA4445 |
| | 3 | Screw | BPZ20P060FMC | | 48 | Arm | CNV2745 |
| | 4 | P.C.Board | CNP2647 | | 49 | Spring | CBH1405 |
| | 5 | P.C.Board | | | 50 | Bracket Unit | CXA4053 |
| | 6 | Socket | CKS2087 | | 51 | Holder Unit | CXA4697 |
| | 7 | Holder | CNC3716 | | 52 | Shaft | CLA1906 |
| | 8 | Connector | CNV2751 | | 53 | Spring | CBH1403 |
| | 9 | Holder | CNV2749 | | 54 | Washer | YE15FUC |
| | 10 | Lens | CNV2750 | | 55 | Detach Unit | CXA4444 |
| | 11 | LCD | CAW1140 | | 56 | Screw | BMZ20P040FZK |
| | 12 | Plug | CKS2360 | | 57 | Grille Unit | CXA4055 |
| | 13 | Holder | CNV2752 | | 58 | Screw | BPZ20P100FZK |
| | 14 | Lamp | CEL-147 | | 59 | Cover | CNS2202 |
| | 15 | Bush | CNV-724 | | 60 | Cover Unit | CXA4483 |
| | 16 | Lamp (IL903-908) | CEL1013 | | 61 | Spacer | CNM3264 |
| | 17 | Screw | BPZ20P080FMC | | 62 | Lens | CNV2747 |
| | 18 | Spacer | CNM1642 | | 63 | Holder | CNC1484 |
| | 19 | Display Unit | CWX1397 | | 64 | Screw | BMZ26P040FMC |
| ◉ | 20 | Button | CAC2890 | ◉ | 65 | CD Mechanism Module | CXK2510 |
| | 21 | Lever | CNV2748 | | 66 | Connector Unit | CXA4720 |
| | 22 | Spring | CBH1407 | | 67 | Holder | CNV2893 |
| | 23 | Button (VOL) | CAC2880 | | 68 | Heat Sink | CNR1245 |
| | 24 | Cushion | CNM3416 | | 69 | Screw | BMZ30P140FMC |
| | 25 | Button (SHIFT) | CAC2897 | | 70 | Earth Plate | CNC4259 |
| | 26 | Seal | CNM3345 | | 71 | IC (IC551) | PA3027A |
| | 27 | Grille Unit | CXA4056 | | 72 | IC (IC951) | PA2019A |
| | 28 | Handle | CNC1631 | | 73 | Holder | CNC3707 |
| | 29 | Button | CAC3054 | | 74 | Connector | CKS1534 |
| | 30 | Button (EJECT) | CAC2881 | ◉ | 75 | Tuner Amp Unit | CWX1403 |
| | 31 | Cushion | CNM3362 | | 76 | Buzzer (BZ751) | CPV1010 |
| | 32 | Button (TA) | CAC2883 | | 77 | Connector | CKS2149 |
| | 33 | Button (AF) | CAC2884 | | 78 | Insulator | CNM3406 |
| | 34 | Button (SOURCE) | CAC2882 | | 79 | Holder | CNC3850 |
| | 35 | Button | CAC3053 | | 80 | Chassis Unit | CXA4051 |
| | 36 | Button (1-6) | CAC3052 | | 81 | Cord | CDE3270 |
| | 37 | Case | CNS2269 | | 82 | ····· | |
| | 38 | Screw | BMZ30P050FMC | | 83 | Bracket | CNC3705 |
| | 39 | Case | CNB1457 | | 84 | Connector | CKS2105 |
| | 40 | Insulator | CNM3193 | | 85 | Connector | CKM1091 |
| | 41 | Spring | CBH1404 | | 86 | ····· | |
| | 42 | Washer | WT22D050D050 | | 87 | Plug | CKS1228 |
| | 43 | Lever | CNC3712 | | 88 | Spacer | CNM3343 |
| | 44 | Arm | CNC3711 | | 89 | Holder | CNC3849 |
| | 45 | Button | CAC2878 | | 90 | Transistor (Q968) | 2SD1944 |

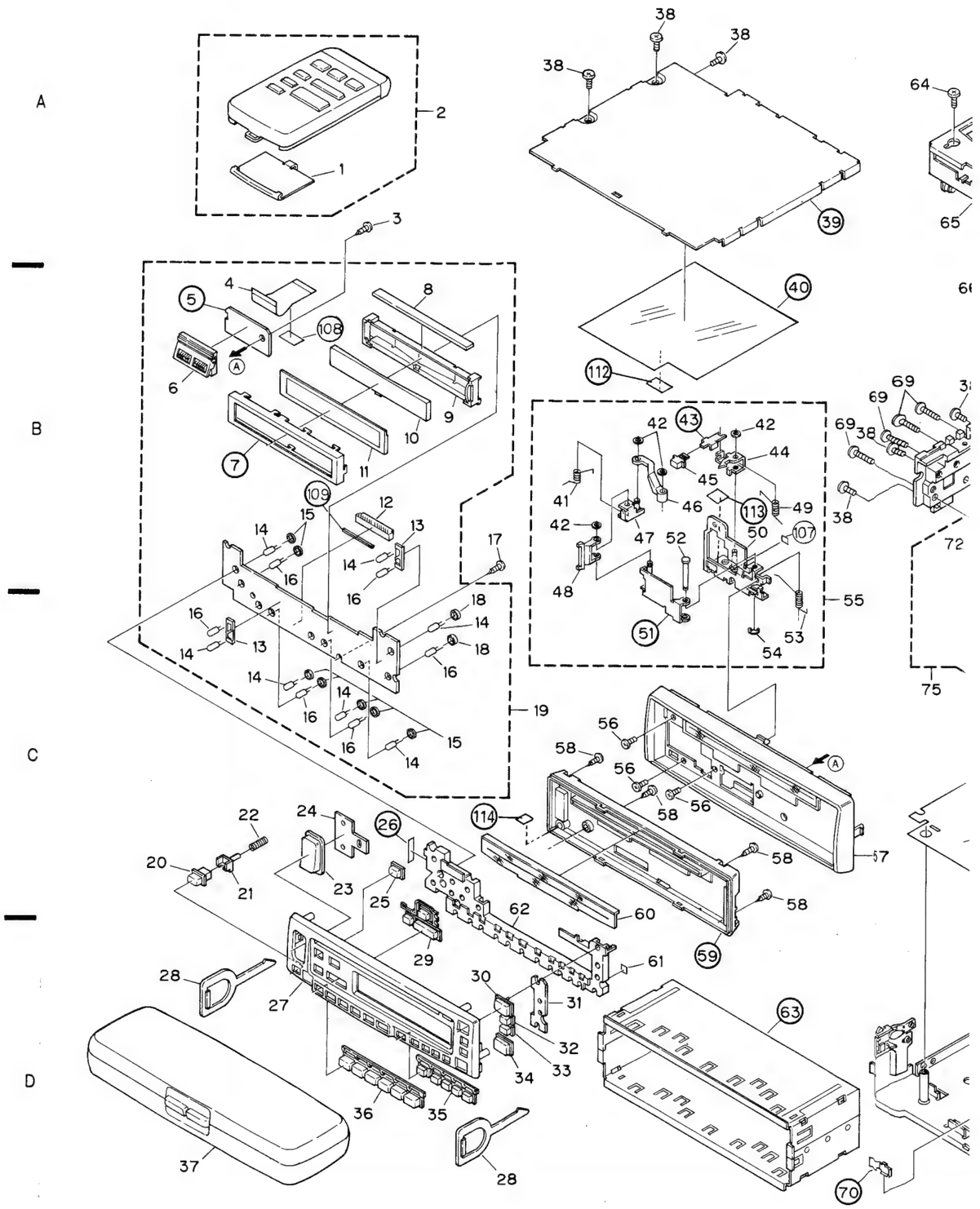
| Mark No. | Description | Part No. | Mark No. | Description | Part No. |
|---|---|---|---|---|---|
| 91 | Cord | CDE3268 | 106 | Cap | CNS1472 |
| 92 | Cap | CNV2680 | 107 | Spacer | CNM3391 |
| 93 | ····· | | 108 | Plate | CNM3367 |
| 94 | Antenna Cable | CDH1129 | 109 | Spacer | CNM3379 |
| 95 | Earth Plate | CNC4147 | ◉ 110 | Logic Unit | CWX1480 |
| 96 | FM/AM Unit | CWE1238 | 111 | Spacer | CNM3395 |
| 97 | Antenna Jack | CKX1010 | 112 | Spacer | CNM3415 |
| 98 | Case | CNB1413 | 113 | Spacer | CNM3394 |
| 99 | Holder | CNC3506 | 114 | Insulator | CNM3398 |
| 100 | FM Front End | CWB1064 | 115 | Spacer | CNM3392 |
| 101 | Insulator | CNM2891 | 116 | Spacer | CNM3396 |
| 102 | Case | CNB1414 | | | |
| 103 | Screw | PMS20P060FMC | | | |
| 104 | Resistor | RS1/2P102JL | | | |
| 105 | Fuse (10A) | CEK1136 | | | |

Note:

- The DEH-M980/UC, DEH-M940/ES, DEH-M77/US and DEH-M980RDS/X1B Parts Lists enumerate the parts which differ from those enumerated in the DEH-M980RDS/EW Parts List only.
  The parts other than those enumerated in the former are indentical with those in the latter, to which you are requested to refer, accordingly.
  The DEH-M980RDS/EW Parts List is given on page 108.

| | | M980RDS/EW | M980/UC | M940/ES | M77/US | M980RDS/X1B |
|---|---|---|---|---|---|---|
| Mark No. | Description | Part No. | Part No. | Part No. | Part No. | Part No. |
| 2 | Remote Control Assy | CXA4419 | CXA4421 | CXA4419 | CXA4420 | CXA4419 |
| 11 | LCD | CAW1140 | CAW1141 | CAW1141 | CAW1141 | CAW1181 |
| 16 | Lamp (IL903-908) | CEL1013 | CEL1025 | CEL1025 | CEL1025 | CEL1013 |
| 19 | Display Unit | CWX1397 | CWX1396 | CWX1396 | CWX1395 | CWX1439 |
| 27 | Grille Unit | CXA4056 | CXA4254 | CXA4255 | CXA4253 | CXA4056 |
| 32 | Button (TA) | CAC2883 | ---- | ---- | ---- | CAC2883 |
| 33 | Button (AF) | CAC2884 | ---- | ---- | ---- | CAC2884 |
| 39 | Case | CNB1457 | CNB1457 | CNB1457 | CNB1457 | CNB1593 |
| 40 | Insulator | CNM3193 | CNM3193 | CNM3193 | CNM3193 | CNM3296 |
| 55 | Detach Unit | CXA4444 | CXA4444 | CXA4444 | CXA4444 | CXA4648 |
| 63 | Holder | CNC1484 | CNC1484 | CNC1484 | CNC1484 | CNC3399 |
| ◉ 75 | Tuner Amp Unit | CWX1403 | CWX1402 | CWX1401 | CWX1400 | CWX1438 |
| 80 | Chassis Unit | CXA4051 | CXA4401 | CXA4401 | CXA4401 | CXA4051 |
| 81 | Cord | CDE3270 | CDE3547 | CDE3546 | CDE3546 | CDE3270 |
| 82 | Cord | ---- | ---- | ---- | CDE3486 | ---- |
| 83 | Bracket | CNC3705 | CNC3705 | CNC3705 | CNC4340 | CNC3705 |
| 86 | Plug | ---- | ---- | ---- | CKS-785 | ---- |
| 91 | Cord | CDE3268 | CDE3477 | CDE3677 | CDE3477 | CDE3661 |
| 92 | Cap | CNV2680 | CNW-829 | CNV2680 | CNV2680 | CDE2680 |
| 93 | Cap | ---- | ---- | ---- | CNV2680 | ---- |
| 96 | FM/AM Unit | CWE1238 | CWE1240 | CWE1240 | CWE1240 | CWE1238 |
| 98 | Case | CNB1413 | ---- | ---- | ---- | CNB1413 |
| 100 | FM Front End | CWB1064 | CWB1063 | CWB1063 | CWB1063 | CWB1064 |
| 101 | Insulator | CNM2891 | ---- | ---- | ---- | CNM2891 |
| 102 | Case | CNB1414 | ---- | ---- | ---- | CNB1414 |
| ◉ 110 | Logic Unit | CWX1480 | ---- | ---- | ---- | CWX1480 |
| 111 | Spacer | CNM3395 | ---- | ---- | ---- | CNM3395 |

## • Chassis



• **Chassis**

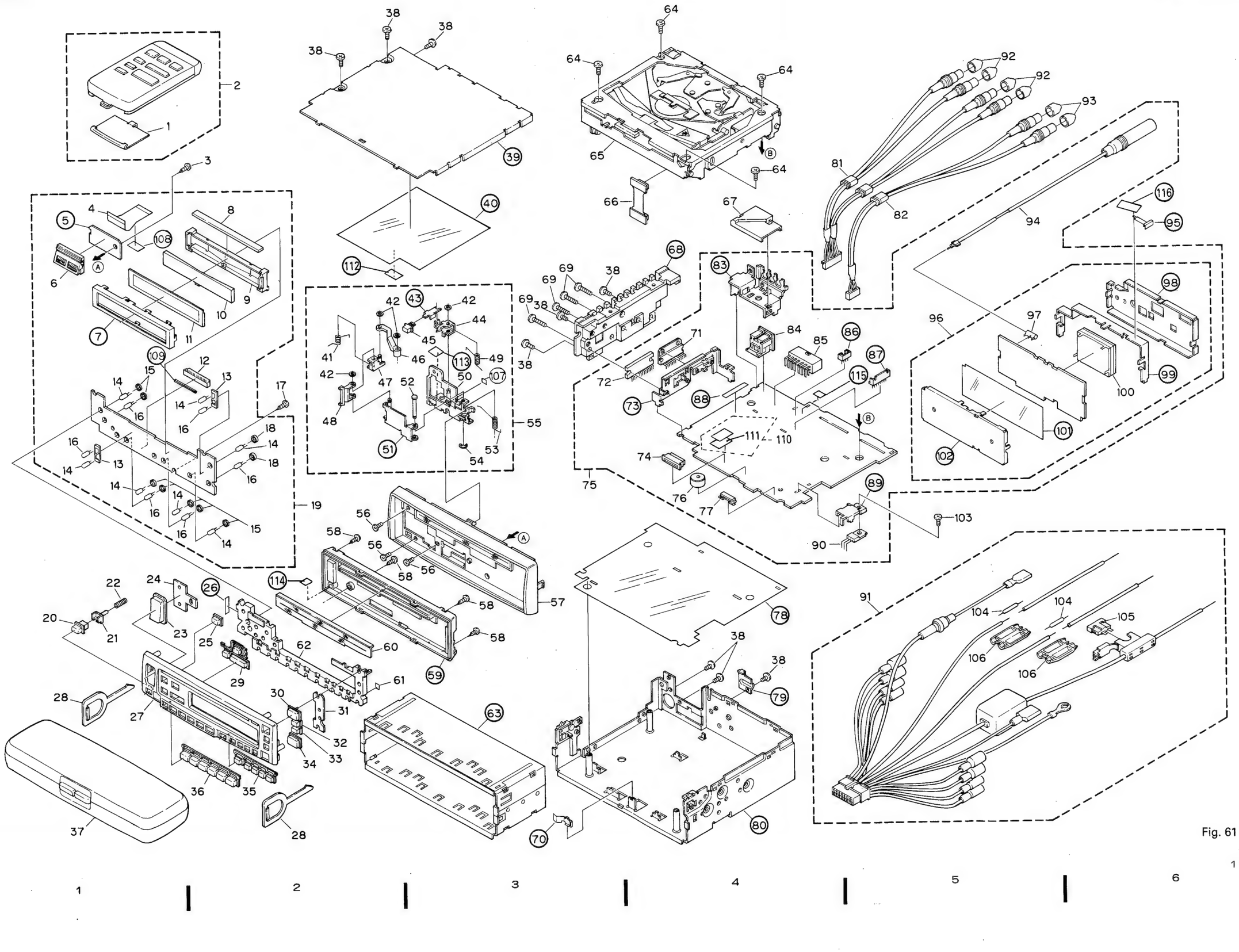



Fig. 61

# 15. ELECTRICAL PARTS LIST

*NOTE:*

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*

*Chip Resistor*

*RS1/□S□□□J,RS1/□□S□□□J*

*Chip Capacitor (except for CQS.....)*

*CKS....., CCS....., CSZS.....*

Unit Number : CWE1238(M980RDS/EW,X1B)
Unit Name : FM/AM Unit

MISCELLANEOUS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| IC 51 | | PA4012B |
| IC 201 | | PA4018 |
| Q 1 2 | | DTC124EU |
| Q 3 71 101 123 | | 2SC4116 |
| Q 51 | | DTA114TU |
| Q 121 | | IMZ1 |
| Q 122 | | FMS1 |
| Q 201 | | FC12 |
| Q 203 205 | | DTC124EU |
| Q 241 | | 2SC2712 |
| D 51 | | MA143-MC |
| D 201 204 | | MA157-MR |
| D 205 | | SVC203CP |
| L 1 51 | Inductor | LYS150K |
| L 2 | Inductor | LPSQR22K |
| L 71 | Inductor | LPSQ3R9K |
| L 101 | Inductor | CTF1126 |
| L 201 | Coil | CTB1068 |
| L 202 | Coil | CTB1082 |
| L 204 | Inductor | CTF1199 |
| L 205 | Inductor | CTF1198 |
| L 206 | Inductor | CTF1197 |
| L 207 | Inductor | CTF1115 |
| T 51 | Coil | CTE1062 |
| T 52 | Coil | CTE1063 |
| T 71 | Coil | CTE1058 |
| T 203 | Coil | CTB1076 |
| T 204 | Coil | CTE1059 |
| T 205 | Coil | CTE1060 |
| T 206 | Coil | CTE1061 |
| L 203 | | LPSQ220K |
| TH 51 102 | Thermister | GGF-928 |
| CF 52 53 | Ceramic Filter | CTF1193 |
| CF 201 | Ceramic Filter | CTF1192 |
| CF 202 | Ceramic Filter | CTF1191 |
| X 151 | Ceramic Resonator | CSS1085 |
| X 201 | Crystal Resonator | CSS1014 |
| VR 1 | Semi-fixed 2.2kΩ(B) | CCP1015 |
| VR 51 101 102 | Semi-fixed 33kΩ(B) | CCP1022 |
| SP 1 | | DSP-201M |
| | FM Front End | CWB1064 |

RESISTORS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| R 1 202 | | RS1/10S681J |
| R 2 | | RS1/16S101J |
| R 3 | | RS1/16S333J |
| R 4 75 107 | | RS1/16S102J |
| R 5 6 54 | | RS1/16S472J |
| R 7 | | RS1/16S560J |
| R 8 | | RS1/16S0R0J |
| R 9 | | RS1/16S0R0J |
| R 56 | | RS1/16S822J |
| R 57 | | RS1/16S472J |
| R 58 | | RS1/16S563J |
| R 59 | | RS1/16S331J |
| R 60 | | RS1/16S473J |
| R 61 105 | | RS1/16S332J |
| R 64 151 152 | | RS1/16S222J |
| R 65 | | RS1/16S273J |
| R 66 | | RS1/16S103J |
| R 72 | | RS1/16S123J |
| R 73 124 126 | | RS1/16S103J |
| R 74 | | RS1/16S331J |
| R 76 | | RS1/16S221J |
| R 101 | | RS1/10S331J |
| R 102 | | RS1/16S472J |
| R 106 128 | | RS1/16S683J |
| R 108 122 | | RS1/16S104J |
| R 111 | | RS1/10S123J |
| R 112 | | RS1/16S684J |
| R 121 | | RS1/10S683J |
| R 123 | | RS1/16S683J |
| R 125 | | RS1/16S154J |
| R 127 | | RS1/16S683J |
| R 129 | | RS1/16S473J |
| R 153 | | RS1/16S222J |
| R 201 | | RS1/16S220J |
| R 203 206 | | RS1/16S222J |
| R 204 213 | | RS1/16S473J |
| R 205 209 | | RS1/16S470J |
| R 207 | | RS1/16S822J |
| R 208 212 | | RS1/10S103J |
| R 210 | | RS1/10S682J |
| R 211 241 242 | | RS1/16S103J |
| R 214 | | RS1/16S182J |
| R 243 | | RS1/10S181J |
| R 244 | | RS1/16S561J |

CAPACITORS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| C 1 111 | | CEV100M16 |
| C 2 51 59 74 | | CKSRYF473Z25 |
| C 3 | | CCSRCH270J50 |
| C 4 55 | | CKSRYB102K50 |
| C 5 | | CKSRYB472K50 |
| C 52 53 61 | | CKSRYB223K25 |
| C 54 | | CCSRSL101J50 |
| C 56 | | CKSRYF104Z25 |
| C 57 | | CSZSR22M35 |
| C 58 | | CCSRCH060D50 |
| C 60 | | CEVNP100M25 |
| C 72 73 241 | | CKSRYB103K25 |
| C 75 | | CKSRYF103Z50 |
| C 101 | | CKSRYB822K25 |
| C 102 | | CKSRYB682K25 |
| C 103 | | CKSRYB272K50 |
| C 105 | | CSZS2R2M10 |
| C 106 | | CEVR47M50 |
| C 107 108 | | CKSRYB222K50 |
| C 110 | | CEVR22M50 |
| C 112 | | CKSYB104K25 |
| C 121 | | CEV4R7M35 |
| C 122 | | CKSRYB471K50 |
| C 123 | | CSZS0R1M35 |
| C 151 152 | | CKSRYB273K16 |
| C 153 | | CSZSR47M20 |
| C 154 155 | | CEV3R3M50 |
| C 156 | | CSZS3R3M10 |
| C 157 | | CEV101M10 |
| C 158 | | CKSRYF473Z25 |
| C 201 | | CKSRYB103K25 |
| C 202 212 | | CKSRYB332K50 |
| C 203 215 219 | | CKSRYF473Z25 |
| C 204 208 | | CKSRYB223K25 |
| C 205 | | CCSRCH220J50 |
| C 206 207 | | CCSRCH820J50 |
| C 210 | | CKSQYF223Z25 |
| C 211 | | CEV2R2M50 |
| C 213 | | CCSRCH330J50 |
| C 216 | | CKSQYF473Z25 |
| C 218 | | CEVNP2R2M35 |
| C 220 | | CCSRCH430J50 |
| C 221 231 | | CCSRCH100D50 |
| C 222 | | CSZS010M16 |
| C 223 | | CKSRYF333Z25 |
| C 224 229 | | CEV470M16 |
| C 225 | | CKSQYF333Z25 |
| C 226 | | CKSQYF473Z25 |
| C 227 | | CEV4R7M35 |
| C 228 | | CKSQYB103K50 |
| C 230 | | CEV220M6R3 |
| C 232 | | CKSRYB102K50 |
| C 240 | | CKSRYF473Z25 |
| C 242 | | CEV100M16 |

Unit Number :
Unit Name : Display Unit

MISCELLANEOUS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| IC 901 | | GGF-921 |
| IC 902 | | RS-20 |
| Q 901 | | 2SC3651 |
| D 901 902 903 904 905 | | MA143-MC |
| D 906 | | CL150URCD |
| D 907 | | MA3056M |
| D 910 911 912 913 914 915 916 | | MA110-1A |
| L 901 | Inductor | CTF1006 |
| X 901 | | CSS1083 |
| S 901 902 903 904 905 906 907 908 909 910 | Switch | CSG1041 |
| S 911 912 913 914 915 916 917 918 919 920 | Switch | CSG1041 |
| S 921 922 | Switch | CSG1041 |
| IL 901 902 909 910 911 912 913 | Lamp 14V40mA | CEL-147 |
| IL 903 904 905 906 907 908 | Lamp 14V40mA | CEL1013 |
| | LCD | CAW1140 |

RESISTORS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| R 901 902 903 904 905 | | RS1/8S102J |
| R 906 | | RS1/8S162J |
| R 907 | | RS1/10S121J |
| R 908 909 910 911 912 913 914 915 916 917 | | RS1/10S471J |
| R 918 | | RS1/10S102J |
| R 919 | | RS1/10S221J |
| R 922 | | RS1/10S222J |

CAPACITORS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| C 901 | | CEV470M6R3 |
| C 903 904 | | CCSQCH102J50 |
| C 905 | | CCSQCH102J50 |
| C 906 | | CKSQYB103K50 |

Unit Number :
Unit Name : Tuner Amp Unit(M980RDS/EW,X1B)

MISCELLANEOUS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| IC 501 | | GGF-919 |
| IC 502 | | LH5116HN-10T |
| IC 503 707 708 852 853 952 | | RC4558M |
| IC 504 | | CWV1020 |
| IC 551 | | PA3027A |
| IC 704 | | PMJ001A |
| IC 751 | | PD4348C |
| IC 753 | | M51955AFP |
| IC 951 | | PA2019A |
| Q 501 504 753 757 758 959 971 | | UN2211 |
| Q 502 | | 2SC3098 |
| Q 505 | | 2SC3295 |
| Q 506 | | UN2211 |
| Q 507 517 523 529 | | 2SC2712 |
| Q 511 512 513 514 | | 2SD1781K |
| Q 515 531 756 951 954 970 983 | | UN2211 |
| Q 516 | | 2SA1298 |
| Q 518 | | UN2211 |
| Q 519 520 | | 2SK208 |
| Q 521 | | 2SJ163 |
| Q 522 851 | | 2SA1162 |
| Q 524 | | DTC124EK |
| Q 525 957 | | 2SC2712 |
| Q 526 | | DTA124EK |
| Q 527 | | DTC124EK |
| Q 528 | | DTC323TK |
| Q 530 755 969 | | UN2111 |
| Q 532 | | 2SA1162 |
| Q 701 702 857 858 | | 2SD1781K |
| Q 706 | | UN2111 |
| Q 707 | | UN2211 |
| Q 751 | | DTC114EK |
| Q 752 | | 2SD1859 |
| Q 759 | | UN2111 |
| Q 760 | | 2SA1162 |
| Q 761 | | 2SD601A |
| Q 855 856 | | 2SD1781K |
| Q 953 956 958 972 973 974 975 | | 2SB1238 |
| Q 955 | | UN221D |
| Q 960 | | UN2111 |
| Q 961 | | UN2211 |
| Q 968 | | 2SD1944 |
| Q 982 | | 2SB1238 |
| D 501 958 | | RD4R7JSB2 |
| D 502 | | RD2R7ESB2 |

| ======Circuit Symbol & No. | Part Name====== | Part No. |
|---|---|---|
| C 60 | | CEVNP100M25 |
| C 72 73 241 | | CKSRYB103K25 |
| | | CKSRYF103Z50 |
| C 75 | | CKSRYB822K25 |
| C 101 | | CKSRYB682K25 |
| C 102 | | |
| C 103 | | CKSRYB272K50 |
| C 105 | | CSZS2R2M10 |
| C 106 | | CEVR47M50 |
| C 107 108 | | CKSRYB222K50 |
| C 110 | | CEVR22M50 |
| C* 112 | | CKSYB104K25 |
| C 121 | | CEV4R7M35 |
| C 122 | | CKSRYB471K50 |
| C 123 | | CSZS0R1M35 |
| C 151 152 | | CKSRYB273K16 |
| C 153 | | CSZSR47M20 |
| C 154 155 | | CEV3R3M50 |
| C 156 | | CSZS3R3M10 |
| C 157 | | CEV101M10 |
| C 158 | | CKSRYF473Z25 |
| C 201 | | CKSRYB103K25 |
| C 202 212 | | CKSRYB332K50 |
| C 203 215 219 | | CKSRYF473Z25 |
| C 204 208 | | CKSRYB223K25 |
| C 205 | | CCSRCH220J50 |
| C 206 207 | | CCSRCH820J50 |
| C 210 | | CKSQYF223Z25 |
| C 211 | | CEV2R2M50 |
| C 213 | | CCSRCH330J50 |
| C 216 | | CKSQYF473Z25 |
| C 218 | | CEVNP2R2M35 |
| C 220 | | CCSRCH430J50 |
| C 221 231 | | CCSRCH100D50 |
| C 222 | | CSZS010M16 |
| C 223 | | CKSRYF333Z25 |
| C 224 229 | | CEV470M16 |
| C 225 | | CKSQYF333Z25 |
| C 226 | | CKSQYF473Z25 |
| C 227 | | CEV4R7M35 |
| C 228 | | CKSQYB103K50 |
| C 230 | | CEV220M6R3 |
| C 232 | | CKSRYB102K50 |
| C 240 | | CKSRYF473Z25 |
| C 242 | | CEV100M16 |

Unit Number :
Unit Name : Display Unit

MISCELLANEOUS

| | | |
|---|---|---|
| IC 901 | | GGF-921 |
| IC 902 | | RS-20 |
| Q 901 | | 2SC3651 |
| D 901 902 903 904 905 | | MA143-MC |
| D 906 | | CL150URCD |
| D 907 | | MA3056M |
| D 910 911 912 913 914 915 916 | | MA110-1A |
| L 901 | Inductor | CTF1006 |
| X 901 | | CSS1083 |
| S 901 902 903 904 905 906 907 908 909 910 | Switch | CSG1041 |
| S 911 912 913 914 915 916 917 918 919 920 | Switch | CSG1041 |
| S 921 922 | Switch | CSG1041 |
| IL 901 902 909 910 911 912 913 | Lamp 14V40mA | CEL-147 |
| IL 903 904 905 906 907 908 | Lamp 14V40mA | CEL1013 |
| | LCD | CAW1140 |



| ======Circuit Symbol & No. | Part Name====== | Part No. |
|---|---|---|
| RESISTORS | | |
| R 901 902 903 904 905 | | RS1/8S102J |
| R 906 | | RS1/8S162J |
| R 907 | | RS1/10S121J |
| R 908 909 910 911 912 913 914 915 916 917 | | RS1/10S471J |
| R 918 | | RS1/10S102J |
| R 919 | | RS1/10S221J |
| R 922 | | RS1/10S222J |
| CAPACITORS | | |
| C 901 | | CEV470M6R3 |
| C 903 904 | | CCSQCH102J50 |
| C 905 | | CCSQCH102J50 |
| C 906 | | CKSQYB103K50 |

Unit Number :
Unit Name : Tuner Amp Unit(M980RDS/EW,X1B)

MISCELLANEOUS

| | | |
|---|---|---|
| IC 501 | | GGF-919 |
| IC 502 | | LH5116HN-10T |
| IC 503 707 708 852 853 952 | | RC4558M |
| IC 504 | | CWV1020 |
| IC 551 | | PA3027A |
| IC 704 | | PMJ001A |
| IC 751 | | PD4348C |
| IC 753 | | M51955AFP |
| IC 951 | | PA2019A |
| Q 501 504 753 757 758 959 971 | | UN2211 |
| Q 502 | | 2SC3098 |
| Q 505 | | 2SC3295 |
| Q 506 | | UN2211 |
| Q 507 517 523 529 | | 2SC2712 |
| Q 511 512 513 514 | | 2SD1781K |
| Q 515 531 756 951 954 970 983 | | UN2211 |
| Q 516 | | 2SA1298 |
| Q 518 | | UN2211 |
| Q 519 520 | | 2SK208 |
| Q 521 | | 2SJ163 |
| Q 522 851 | | 2SA1162 |
| Q 524 | | DTC124EK |
| Q 525 957 | | 2SC2712 |
| Q 526 | | DTA124EK |
| Q 527 | | DTC124EK |
| Q 528 | | DTC323TK |
| Q 530 755 969 | | UN2111 |
| Q 532 | | 2SA1162 |
| Q 701 702 857 858 | | 2SD1781K |
| Q 706 | | UN2111 |
| Q 707 | | UN2211 |
| Q 751 | | DTC114EK |
| Q 752 | | 2SD1859 |
| Q 759 | | UN2111 |
| Q 760 | | 2SA1162 |
| Q 761 | | 2SD601A |
| Q 855 856 | | 2SD1781K |
| Q 953 956 958 972 973 974 975 | | 2SB1238 |
| Q 955 | | UN221D |
| Q 960 | | UN2111 |
| Q 961 | | UN2211 |
| Q 968 | | 2SD1944 |
| Q 982 | | 2SB1238 |
| D 501 958 | | RD4R7JSB2 |
| D 502 | | RD2R7ESB2 |

| ======Circuit Symbol & No. | Part Name====== | Part No. |
|---|---|---|
| D 503 | | HZM2R7NB1 |
| D 508 | | MA151WA-MN |
| D 510 770 967 | | MA151WK-MT |
| D 702 | | MA151WA-MN |
| D 752 753 754 755 756 757 759 760 766 771 | | 1SS133 |
| D 761 762 763 764 765 | | MA153-MC |
| D 767 | | HZS7A1L |
| D 769 | | MA151WK-MT |
| D 772 773 774 775 777 778 951 966 | | 1SS133 |
| D 853 | | MA151WA-MN |
| D 952 | | RB100AVH |
| D 953 | | SM-3-02LFEA |
| D 954 956 | | ERA15-02VH |
| D 955 | | ERA15-10VH |
| D 959 | | 1SS133 |
| D 964 | | HZS9C3L |
| D 965 | | MA151WK-MT |
| D 968 | | 1SS133 |
| D 969 | | ERA15-02VH |
| L 502 504 952 | Inductor | LPS1R0K |
| L 503 | Inductor | LPS1R0K |
| L 505 | Inductor | CTF1006 |
| L 953 954 | Inductor | CTF1006 |
| TC 751 | Trimmer | CCL1017 |
| IB 551 552 | | CWW1338 |
| X 501 | Crystal Resonator | CSS1011 |
| X 751 | Crystal Resonator | CSS1023 |
| S 751 | Switch | CSG1020 |
| VR 502 | | CCP1136 |
| EF 951 | | CCG1003 |
| BZ 751 | Buzzer | CPV1010 |
| ZN 951 | Surge Absorber | ERZ-C07DK220 |
| | FM/AM Unit | CWE1238 |

RESISTORS

| | |
|---|---|
| R 501 | RS1/10S563J |
| R 502 518 563 745 746 747 | RS1/10S472J |
| R 503 | RS1/10S331J |
| R 504 506 | RS1/10S101J |
| R 505 | RS1/10S182J |
| R 507 | RS1/10S821J |
| R 509 513 542 569 817 852 853 | RS1/10S222J |
| R 510 | RS1/10S222J |
| R 511 | RS1/10S335J |
| R 512 519 520 521 532 533 534 | RS1/10S102J |
| R 514 877 878 890 891 951 952 | RS1/10S223J |
| R 515 781 | RS1/10S221J |
| R 516 517 784 787 790 992 | RS1/10S103J |
| R 522 536 537 789 804 823 850 851 | RS1/10S222J |
| R 524 525 970 | RS1/10S563J |
| R 526 527 | RS1/10S822J |
| R 528 529 | RS1/10S222J |
| R 535 | RS1/10S152J |
| R 538 544 773 798 799 814 815 | RS1/10S473J |
| R 539 | RS1/10S474J |
| R 543 568 | RS1/10S222J |
| R 545 | RS1/10S104J |
| R 546 | RS1/10S102J |
| R 547 548 560 561 | RS1/10S102J |
| R 549 550 | RS1/10S472J |
| R 551 | RS1/10S334J |
| R 552 | RS1/10S224J |
| R 553 | RS1/10S123J |
| R 554 | RS1/10S334J |
| R 555 | RS1/10S272J |

| ======Circuit Symbol & No. | Part Name====== | Part No. |
|---|---|---|
| R 556 | | RS1/10S272J |
| R 557 | | RS1/10S393J |
| R 558 | | RS1/10S102J |
| R 559 | | RS1/10S102J |
| R 562 | | RS1/10S224J |
| R 570 | | RS1/10S821J |
| R 585 586 | | RS1/10S0R0J |
| R 589 590 591 592 | | RS1/10S472J |
| R 597 598 601 602 603 604 606 | | RS1/10S2R2J |
| R 599 996 | | RS1/10S472J |
| R 605 | | RS1/10S2R2J |
| R 607 791 792 793 794 795 | | RS1/10S471J |
| R 608 | | RS1/10S220J |
| R 609 | | RD1/4PS2R2JL |
| R 610 | | RS1/8S2R2J |
| R 701 702 | | RS1/10S133J |
| R 703 704 | | RS1/10S153J |
| R 709 710 | | RS1/10S113J |
| R 711 712 | | RS1/10S133J |
| R 713 714 | | RS1/10S513J |
| R 715 716 | | RS1/10S223J |
| R 717 718 | | RS1/10S222J |
| R 740 | | RS1/10S152J |
| R 741 | | RS1/10S151J |
| R 742 | | RS1/10S151J |
| R 743 | | RS1/10S272J |
| R 744 | | RS1/10S272J |
| R 748 | | RS1/10S103J |
| R 759 | | RS1/10S683J |
| R 760 761 764 | | RS1/10S473J |
| R 769 770 772 774 | | RS1/10S682J |
| R 771 782 783 | | RS1/10S103J |
| R 775 776 777 778 779 | | RS1/10S221J |
| R 780 | | RD1/4PS102JL |
| R 785 786 | | RS1/10S332J |
| R 788 | | RD1/4PS362JL |
| R 796 | | RS1/10S100J |
| R 803 899 | | RS1/10S0R0J |
| R 805 827 828 | | RS1/10S104J |
| R 806 807 | | RS1/10S473J |
| R 808 | | RS1/10S473J |
| R 809 | | RS1/10S0R0J |
| R 810 | | RS1/10S473J |
| R 825 | | RS1/10S102J |
| R 837 | | RS1/10S563J |
| R 838 | | RD1/4PS473JL |
| R 839 | | RS1/10S472J |
| R 840 | | RS1/10S472J |
| R 841 842 969 | | RS1/10S102J |
| R 854 956 960 994 | | RS1/10S472J |
| R 869 870 882 883 | | RS1/10S182J |
| R 873 874 886 887 964 | | RS1/10S472J |
| R 875 876 888 889 | | RS1/10S102J |
| R 953 | | RS1/10S752J |
| R 957 965 972 974 976 978 | | RD1/4PS332JL |
| R 959 | | RS1/10S102J |
| R 961 | | RD1/4PS472JL |
| R 973 975 977 981 | | RS1/10S332J |
| R 979 | | RS1/10S103J |
| R 982 | | RS1/10S183J |
| R 990 | | RD1/4PS471JL |
| R 991 | | RD1/4PS221JL |
| R 993 | | RS1/10S392J |
| R 997 | | RS1/10S560J |
| R 998 | | RS1/10S100J |
| R 999 | | RD1/4PS152JL |

| ======Circuit Symbol & No. Part Name====== | Part No. |
|---|---|
| D 503 | HZM2R7NB1 |
| D 508 | MA151WA-MN |
| D 510 770 967 | MA151WK-MT |
| D 702 | MA151WA-MN |
| D 752 753 754 755 756 757 759 760 766 771 | 1SS133 |
| D 761 762 763 764 765 | MA153-MC |
| D 767 | HZS7A1L |
| D 769 | MA151WK-MT |
| D 772 773 774 775 777 778 951 966 | 1SS133 |
| D 853 | MA151WA-MN |
| D 952 | RB100AVH |
| D 953 | SM-3-02LFEA |
| D 954 956 | ERA15-02VH |
| D 955 | ERA15-10VH |
| D 959 | 1SS133 |
| D 964 | HZS9C3L |
| D 965 | MA151WK-MT |
| D 968 | 1SS133 |
| D 969 | ERA15-02VH |
| L 502 504 952 Inductor | LPS1R0K |
| L 503 Inductor | LPS1R0K |
| L 505 Inductor | CTF1006 |
| L 953 954 Inductor | CTF1006 |
| TC 751 Trimmer | CCL1017 |
| IB 551 552 | CWW1338 |
| X 501 Crystal Resonator | CSS1011 |
| X 751 Crystal Resonator | CSS1023 |
| S 751 Switch | CSG1020 |
| VR 502 | CCP1136 |
| EF 951 | CCG1003 |
| BZ 751 Buzzer | CPV1010 |
| ZN 951 Surge Absorber | ERZ-C07DK220 |
| FM/AM Unit | CWE1238 |

RESISTORS

| | |
|---|---|
| R 501 | RS1/10S563J |
| R 502 518 563 745 746 747 | RS1/10S472J |
| R 503 | RS1/10S331J |
| R 504 506 | RS1/10S101J |
| R 505 | RS1/10S182J |
| R 507 | RS1/10S821J |
| R 509 513 542 569 817 852 853 | RS1/10S222J |
| R 510 | RS1/10S222J |
| R 511 | RS1/10S335J |
| R 512 519 520 521 532 533 534 | RS1/10S102J |
| R 514 877 878 890 891 951 952 | RS1/10S223J |
| R 515 781 | RS1/10S221J |
| R 516 517 784 787 790 992 | RS1/10S103J |
| R 522 536 537 789 804 823 850 851 | RS1/10S222J |
| R 524 525 970 | RS1/10S563J |
| R 526 527 | RS1/10S822J |
| R 528 529 | RS1/10S222J |
| R 535 | RS1/10S152J |
| R 538 544 773 798 799 814 815 | RS1/10S473J |
| R 539 | RS1/10S474J |
| R 543 568 | RS1/10S222J |
| R 545 | RS1/10S104J |
| R 546 | RS1/10S102J |
| R 547 548 560 561 | RS1/10S102J |
| R 549 550 | RS1/10S472J |
| R 551 | RS1/10S334J |
| R 552 | RS1/10S224J |
| R 553 | RS1/10S123J |
| R 554 | RS1/10S334J |
| R 555 | RS1/10S272J |

| ======Circuit Symbol & No. Part Name====== | Part No. |
|---|---|
| R 556 | RS1/10S272J |
| R 557 | RS1/10S393J |
| R 558 | RS1/10S102J |
| R 559 | RS1/10S102J |
| R 562 | RS1/10S224J |
| R 570 | RS1/10S821J |
| R 585 586 | RS1/10S0R0J |
| R 589 590 591 592 | RS1/10S472J |
| R 597 598 601 602 603 604 606 | RS1/10S2R2J |
| R 599 996 | RS1/10S472J |
| R 605 | RS1/10S2R2J |
| R 607 791 792 793 794 795 | RS1/10S471J |
| R 608 | RS1/10S220J |
| R 609 | RD1/4PS2R2JL |
| R 610 | RS1/8S2R2J |
| R 701 702 | RS1/10S133J |
| R 703 704 | RS1/10S153J |
| R 709 710 | RS1/10S113J |
| R 711 712 | RS1/10S133J |
| R 713 714 | RS1/10S513J |
| R 715 716 | RS1/10S223J |
| R 717 718 | RS1/10S222J |
| R 740 | RS1/10S152J |
| R 741 | RS1/10S151J |
| R 742 | RS1/10S151J |
| R 743 | RS1/10S272J |
| R 744 | RS1/10S272J |
| R 748 | RS1/10S103J |
| R 759 | RS1/10S683J |
| R 760 761 764 | RS1/10S473J |
| R 769 770 772 774 | RS1/10S682J |
| R 771 782 783 | RS1/10S103J |
| R 775 776 777 778 779 | RS1/10S221J |
| R 780 | RD1/4PS102JL |
| R 785 786 | RS1/10S332J |
| R 788 | RD1/4PS362JL |
| R 796 | RS1/10S100J |
| R 803 899 | RS1/10S0R0J |
| R 805 827 828 | RS1/10S104J |
| R 806 807 | RS1/10S473J |
| R 808 | RS1/10S473J |
| R 809 | RS1/10S0R0J |
| R 810 | RS1/10S473J |
| R 825 | RS1/10S102J |
| R 837 | RS1/10S563J |
| R 838 | RD1/4PS473JL |
| R 839 | RS1/10S472J |
| R 840 | RS1/10S472J |
| R 841 842 969 | RS1/10S102J |
| R 854 956 960 994 | RS1/10S472J |
| R 869 870 882 883 | RS1/10S182J |
| R 873 874 886 887 964 | RS1/10S472J |
| R 875 876 888 889 | RS1/10S102J |
| R 953 | RS1/10S752J |
| R 957 965 972 974 976 978 | RD1/4PS332JL |
| R 959 | RS1/10S102J |
| R 961 | RD1/4PS472JL |
| R 973 975 977 981 | RS1/10S332J |
| R 979 | RS1/10S103J |
| R 982 | RS1/10S183J |
| R 990 | RD1/4PS471JL |
| R 991 | RD1/4PS221JL |
| R 993 | RS1/10S392J |
| R 997 | RS1/10S560J |
| R 998 | RS1/10S100J |
| R 999 | RD1/4PS152JL |

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| **CAPACITORS** | | |
| C 501 | | CEA470M6R3LL |
| C 502 | | CEA101M16LL |
| C 503 504 544 571 572 575 576 | | CKSQYB102K50 |
| C 505 506 | | CEA4R7M50LL |
| C 507 508 | | CCSQCH101J50 |
| C 509 | | CCSQCH470J50 |
| C 510 511 512 513 519 527 540 560 753 | | CKSQYB103K50 |
| C 514 | | CEAR47M50LL |
| C 515 956 | | CKSQYB103K50 |
| C 516 517 529 530 541 951 957 975 | | CKSQYB473K25 |
| C 518 538 539 | | CEA4R7M50LL |
| C 520 761 | | CEA470M25LL |
| C 528 | | CKSQYB223K50 |
| C 531 | | CEAR22M50LL |
| C 532 | | CKSYB224K25 |
| C 533 534 | | CCSQCH100D50 |
| C 535 | | CKSQYB102K50 |
| C 536 | | CKSQYB683K25 |
| C 537 | | CKSYB224K25 |
| C 542 | | CEA221M6R3LL |
| C 543 | | CCSQCH681J50 |
| C 545 546 | | CCSQCH151J50 |
| C 547 | | CKSQYB103K50 |
| C 548 | | CKSYB104K25 |
| C 549 955 972 973 | | CKSYB104K25 |
| C 550 552 | | CEA100M35LL |
| C 557 558 | | CKSQYB102K50 |
| C 561 562 563 564 565 566 567 568 | | CKSYB104K25 |
| C 569 | | CKSYB104K50 |
| C 573 | | CEHAQ100M50 |
| C 574 | | CKSYB104K50 |
| C 577 578 | | CEA330M10LL |
| C 579 580 | | CEA330M10LL |
| C 593 | | CFTNA474J50 |
| C 595 | | CEA101M6R3LL |
| C 596 | | CKSQYB103K50 |
| C 597 | | CKSQYB473K50 |
| C 598 | | CASA680K10 |
| C 599 | | CCSQCH470J50 |
| C 611 612 | | CCSQCH101J50 |
| C 613 | | CCSQCH221J50 |
| C 701 702 | | CEA330M10LL |
| C 703 704 | | CCSQCH101J50 |
| C 705 | | CKSQYB472K50 |
| C 715 716 850 851 852 853 | | CCSQCH470J50 |
| C 717 719 720 722 | | CEA330M10LL |
| C 718 | | CKSQYB472K50 |
| C 752 | | CKSQYB102K50 |
| C 754 | | CKSYB104K25 |
| C 755 | | CCSQCH150J50 |
| C 758 | | CKSQYB472K50 |
| C 759 760 963 967 971 986 987 988 | | CKSQYB473K25 |
| C 762 961 | | CKSQYB103K50 |
| C 763 764 952 | | CEA010M50LL |
| C 765 | | CKSQYB822K50 |
| C 766 | | CKSQYB822K50 |
| C 767 768 | | CEA4R7M50LL |
| C 769 770 783 | | CEA2R2M50LL |
| C 771 772 | | CKSQYB333K25 |
| C 773 774 | | CKSYB224K25 |
| C 775 776 | | CKSQYB332K50 |
| C 777 778 | | CKSQYB183K25 |
| C 779 780 | | CCSQCH221J50 |
| C 781 782 860 861 867 868 | | CEA330M10LL |
| C 784 791 792 | | CEA100M35LL |
| C 786 | | CKSQYB473K25 |
| C 793 | | CKSQYB102K50 |
| C 869 870 876 877 | | CEA330M10LL |
| C 953 954 | 3300 μF/16V | CCH1125 |
| C 959 985 | | CEHAQ470M25 |
| C 960 964 966 978 | | CEHAQ101M10 |
| C 965 | | CKSQYB473K25 |
| C 969 989 | 1000 μF/16V | CCH1003 |
| C 970 | | CEHAQ470M25 |
| C 974 | | CEA100M35LL |
| C 982 | | CKSQYB472K50 |
| C 984 | | CEHAS470M16 |
| C 990 | | CEA330M10LL |
| C 991 | | CKSQYB473K50 |

Unit Number : CWX1454
Unit Name : Control Unit

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| **MISCELLANEOUS** | | |
| IC 351 | | UPC1347GS |
| IC 601 | | UPD6374GH |
| IC 602 | | RC4558M |
| IC 651 | | PA3026 |
| IC 653 | | M5218FP |
| IC 701 | | UPD6375GC |
| IC 702 | | TC9237F |
| IC 703 | | TA2009F |
| IC 751 | | PD5156C |
| IC 752 | | MB3854PF |
| Q 351 | | 2SB1260 |
| Q 601 | | 2SB709A |
| Q 651 | | 2SB1184F5 |
| Q 652 | | 2SB1184F5 |
| Q 654 705 | | DTC114EK |
| Q 701 702 | | DTC323TK |
| Q 703 | | DTC114EK |
| Q 704 | | DTA114EK |
| Q 752 | | DTA114EK |
| Q 753 | | DTA114EK |
| Q 754 | | DTC114EK |
| Q 755 | | 2SD1760F5 |
| Q 756 | | 2SD1030 |
| D 651 | | SC016-2 |
| D 652 | | SC016-2 |
| D 701 | | MA151WA-MN |
| D 751 | | MA151A-MA |
| D 757 | | HZM6R8NB2 |
| D 758 | | MA151A-MA |
| L 601 602 603 604 751 | Inductor | CTF1082 |
| L 701 | Inductor | CTF1082 |
| TH 752 | Thermister | CCX1007 |
| X 701 | Crystal Resonator | CSS1067 |
| X 751 | | CSS1084 |
| VR 351 | Semi-fixed 22kΩ(B) | CCP1156 |
| VR 352 355 | Semi-fixed 47kΩ(B) | CCP1158 |
| VR 353 354 | Semi-fixed 2.2kΩ(B) | CCP1150 |
| VR 356 | Semi-fixed 22kΩ(B) | CCP1156 |
| **RESISTORS** | | |
| R 351 | | RS1/2S220J |
| R 352 372 | | RS1/16S472J |
| R 353 | | RS1/16S623J |
| R 354 757 758 779 | | RS1/16S473J |
| R 355 | | RS1/16S122J |
| R 356 | | RS1/16S683J |
| R 357 | | RS1/16S683J |
| R 358 | | RS1/16S332J |
| R 359 | | RS1/16S332J |
| R 360 | | RS1/16S684J |

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| R 361 | | RS1/16S153J |
| R 364 | | RS1/16S102J |
| R 369 | | RS1/16S103J |
| R 371 373 | | RS1/16S223J |
| R 374 | | RS1/16S912J |
| R 375 377 713 | | RS1/16S102J |
| R 379 | | RS1/16S513J |
| R 380 | | RS1/16S104J |
| R 381 | | RS1/16S133J |
| R 382 | | RS1/16S133J |
| R 601 602 603 604 605 607 610 | | RS1/16S103J |
| R 606 | | RS1/16S224J |
| R 609 | | RS1/16S102J |
| R 611 612 665 | | RS1/16S102J |
| R 613 | | RS1/16S102J |
| R 614 | | RS1/16S472J |
| R 615 | | RS1/16S472J |
| R 616 | | RS1/16S102J |
| R 651 653 701 702 706 711 712 764 | | RS1/16S102J |
| R 652 | | RS1/16S162J |
| R 654 | | RS1/16S162J |
| R 655 | | RS1/16S752J |
| R 656 | | RS1/16S362J |
| R 657 | | RS1/16S162J |
| R 658 | | RS1/16S102J |
| R 663 | | RS1/10S181J |
| R 664 753 755 | | RS1/16S103J |
| R 669 703 797 | | RS1/16S103J |
| R 670 | | RS1/10S151J |
| R 675 | | RS1/16S913J |
| R 676 | | RS1/16S913J |
| R 677 681 | | RS1/16S0R0J |
| R 679 | | RS1/16S102J |
| R 680 | | RS1/16S0R0J |
| R 683 | | RS1/16S0R0J |
| R 684 | | RS1/16S102J |
| R 707 708 | | RS1/16S223J |
| R 715 | | RS1/16S0R0J |
| R 717 | | RS1/16S301J |
| R 719 789 | | RS1/16S0R0J |
| R 721 | | RS1/16S472J |
| R 722 | | RS1/16S162J |
| R 724 | | RS1/10S1R0J |
| R 725 | | RS1/16S472J |
| R 751 | | RS1/10S1R0J |
| R 752 | | RS1/16S183J |
| R 754 776 | | RS1/16S472J |
| R 756 771 772 773 | | RS1/16S222J |
| R 765 793 | | RS1/16S102J |
| R 766 | | RS1/16S473J |
| R 767 768 769 770 | | RS1/16S104J |
| R 774 | | RS1/16S102J |
| R 775 | | RS1/16S104J |
| R 778 | | RS1/16S103J |
| R 780 | | RS1/16S104J |
| R 781 782 | | RS1/16S362J |
| R 783 784 785 786 787 | | RS1/16S681J |
| R 788 | | RS1/16S102J |
| R 791 792 | | RS1/16S391J |
| R 794 | | RS1/16S151J |
| R 799 | | RS1/10S1R5J |

CAPACITORS

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| C 351 | | CEV470M16 |
| C 352 | | CKSQYB104K25 |
| C 353 709 | | CEV101M6R3 |
| C 354 355 | | CSZSR4R7M10 |
| C 357 359 366 | | CKSRYB102K50 |
| C 358 | | CKSRYB331K50 |
| C 360 | | CKSRYB271K50 |
| C 361 | | CCSRCH220J50 |
| C 367 | | CKSYB154K25 |
| C 368 | | CKSQYB104K25 |
| C 369 373 604 606 703 704 | | CKSYB224K25 |
| C 370 | | CKSQYB473K50 |
| C 601 | | CKSRYB222K50 |
| C 602 | | CKSRYB222K50 |
| C 603 | | CKSRYB331K50 |
| C 605 | | CKSYB103K25 |
| C 607 654 759 760 | | CKSYB224K25 |
| C 608 | | CSZS010M16 |
| C 609 610 761 | | CEV100M16 |
| C 611 701 707 710 | | CKSRYB103K25 |
| C 651 702 708 | | CEV101M6R3 |
| C 652 | | CKSYB224K25 |
| C 655 668 | | CKSRYB391K50 |
| C 658 | 470 μF/10V | CCH1120 |
| C 662 665 | | CEV101M10 |
| C 666 | | CKSQYB102K50 |
| C 670 | | CKSQYB273K50 |
| C 671 | | CKSRYB103K25 |
| C 672 | | CKSQYB473K25 |
| C 705 706 | | CCSRCH090D50 |
| C 712 | | CEV470M6R3 |
| C 713 714 | | CKSRYB561K50 |
| C 715 | | CCSRCH100D50 |
| C 716 | | CEV100M16 |
| C 722 723 | | CEV4R7M35 |
| C 724 | | CCSRCH151J50 |
| C 726 | | CCSRCH100D50 |
| C 727 728 | | CKSRYB103K25 |
| C 751 752 | | CCSRCH221J50 |
| C 753 754 755 | | CCSRCH221J50 |
| C 756 | | CKSRYB472K50 |

Unit Number :
Unit Name : Switch P.C.Board

| | | | | | | |
|---|---|---|---|---|---|---|
| D | 1 | 2 | 3 | 4 | | BR4361F |
| M | 1 | | | | Motor(Spindle) | CXM1058 |
| M | 2 | | | | Motor Unit(Carriage) | CXA4649 |
| M | 3 | | | | Motor Unit(Loading) | CXA4267 |
| S | 1 | 2 | | | Switch(Home,Clamp) | CSN1012 |

Unit Number :
Unit Name : Detector P.C.Board

| | | | | | | |
|---|---|---|---|---|---|---|
| P | 1 | 2 | 3 | 4 | Photo Transistor | PT4800 |

Miscellaneous Parts List

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| | Fuse10A | CEK1136 |
| | PU Unit | CGY1020 |

Unit Number :
Unit Name :Logic Unit (M980RDS/EW,X1B)

Miscellaneous Parts List

| Circuit Symbol & No. | Part Name | Part No. |
|---|---|---|
| IC 1 | | UPD4538BG |
| Q 1 | | UN2111 |
| D 1 | | MA151WK-MT |
| D 2 | | MA151K-MH |
| R 1 | | RS1/10473J |
| C 1 | | CSZS010M16 |
| C 2 | | CKSQYB103K50 |

- The DEH-M980/UC, DEH-M940/ES, DEH-M77/US and DEH-M980RDS/X1B Parts Lists enumerate the parts which differ from those enumerated in the DEH-M980RDS/EW Parts List only.
  The parts other than those enumerated in the former are indentical with those in the latter, to which you are requested to refer, accordingly.
  The DEH-M980RDS/EW Parts List is given on page 112.

Tuner Amp Unit

| | M980RDS/EW, X1B | M980/UC | M940/ES | M77/US |
|---|---|---|---|---|
| IC501 | GGF-919 | GGF-927 | GGF-927 | GGF-927 |
| IC502 | LH5116HN | ---- | ---- | ---- |
| IC504 | CWV1020 | ---- | ---- | ---- |
| IC701 | ---- | ---- | ---- | TC9213P |
| IC702 | ---- | ---- | ---- | TC4052BF |
| IC710 712 | ---- | ---- | ---- | RC4558M |
| Q506 961 | UN2211 | ---- | ---- | ---- |
| Q518 | UN2211 | ---- | ---- | ---- |
| Q521 | 2SJ163 | ---- | ---- | ---- |
| Q522 | 2SA1162 | ---- | ---- | ---- |
| Q523 529 | 2SC2712 | ---- | ---- | ---- |
| Q524 | DTC124EK | ---- | ---- | ---- |
| Q525 | 2SC2712 | ---- | ---- | ---- |
| Q526 | DTA124EK | ---- | ---- | ---- |
| Q527 | DTC124EK | ---- | ---- | ---- |
| Q528 | DTC323TK | ---- | ---- | ---- |
| Q708 | ---- | ---- | ---- | 2SD1781K |
| Q760 | 2SA1162 | 2SA1162 | ---- | 2SA1162 |
| Q960 | UN2111 | ---- | ---- | ---- |
| D703 | ---- | ---- | ---- | MA151WK-MT |
| D966 968 | 1SS133 | 1SS133 | ---- | 1SS133 |
| VR502 | CCP1136 | ---- | ---- | ---- |
| R511 | RS1/10S335J | ---- | ---- | ---- |
| R537 | RS1/10S222J | ---- | ---- | ---- |
| R538 | RS1/10S473J | ---- | ---- | ---- |
| R539 | RS1/10S474J | ---- | ---- | ---- |
| R540 | ---- | ---- | ---- | ---- |
| R541 | ---- | ---- | RS1/10S0R0J | ---- |
| R551 | RS1/10S334J | ---- | ---- | ---- |
| R552 | RS1/10S224J | RS1/10S224J | ---- | ---- |
| R553 | RS1/10S123J | ---- | ---- | ---- |
| R554 | RS1/10S334J | ---- | ---- | ---- |
| R555 556 | RS1/10S272J | ---- | ---- | ---- |
| R557 | RS1/10S393J | ---- | ---- | ---- |
| R559 | RS1/10S102J | ---- | ---- | ---- |
| R575 | ---- | RS1/10S0R0J | RS1/10S0R0J | RS1/10S0R0J |
| R607 | RS1/10S471J | ---- | ---- | ---- |
| R608 | RS1/10S220J | ---- | ---- | ---- |
| R705 706 | ---- | ---- | ---- | RS1/10S682J |
| R707 708 719 | ---- | ---- | ---- | RS1/10S473J |

| | M980RDS/EW, X1B | M980/UC | M940/ES | M77/US |
|---|---|---|---|---|
| R724 | ---- | ---- | ---- | RS1/10S104J |
| R721 725 | ---- | ---- | ---- | RS1/10S104J |
| R726 735 | ---- | ---- | ---- | RS1/10S474J |
| R727 | ---- | ---- | ---- | RS1/10S203J |
| R728 736 | ---- | ---- | ---- | RS1/10S243J |
| R729 | ---- | ---- | ---- | RS1/10S123J |
| R730 733 | ---- | ---- | ---- | RS1/10S153J |
| R731 | ---- | ---- | ---- | RS1/10S822J |
| R732 734 | ---- | ---- | ---- | RS1/10S103J |
| R739 | ---- | ---- | ---- | RS1/10S391J |
| R749 | ---- | ---- | ---- | RS1/10S223J |
| R756-758 | ---- | ---- | ---- | RS1/10S102J |
| R765 | ---- | ---- | ---- | RS1/10S222J |
| R798 | RS1/10S473J | RS1/10S473J | ---- | RS1/10S473J |
| R799 | RS1/10S473J | ---- | RS1/10S473J | ---- |
| R800 | ---- | ---- | ---- | RS1/10S473J |
| R801 | ---- | ---- | RS1/10S0R0J | ---- |
| R802 | ---- | RS1/10S0R0J | ---- | RS1/10S0R0J |
| R803 | RS1/10S0R0J | RS1/10S0R0J | RS1/10S0R0J | ---- |
| R839 840 | RS1/10S472J | RS1/10S472J | ---- | RS1/10S472J |
| R898 | ---- | ---- | ---- | ---- |
| R982 | RS1/10S183J | RS1/10S183J | ---- | RS1/10S183J |
| C501 | CEA470M6R3LL | ---- | ---- | ---- |
| C502 | CEA101M16LL | ---- | ---- | ---- |
| C514 | CEAR47M50LL | ---- | ---- | ---- |
| C528 | CKSQYB223K50 | ---- | ---- | ---- |
| C541 965 | CKSQYB473K25 | ---- | ---- | ---- |
| C542 | CEA221M6R3LL | ---- | ---- | ---- |
| C547 | CKSQYB103K50 | ---- | ---- | ---- |
| C548 | CKSYB104K25 | ---- | ---- | ---- |
| C549 | CKSYB104K25 | ---- | ---- | ---- |
| C550 | CEA100M35LL | ---- | ---- | ---- |
| C559 | ---- | ---- | ---- | ---- |
| C721 724 729 732 735 | ---- | ---- | ---- | CEA100M35LL |
| C726-728 | ---- | ---- | ---- | CKSYB224K25 |
| C730 | ---- | ---- | ---- | CEAR47M50NPLL |
| C733 | ---- | ---- | ---- | CKSYB273K25 |
| C978 | CEHAQ101M10 | ---- | ---- | ---- |

FM/AM Unit

| | M980RDS/EW, X1B | M980/UC | M940/ES | M77/US |
|---|---|---|---|---|
| FM/AM Unit | CWE1238 | CWE1240 | CWE1240 | CWE1240 |
| Q51 | DTA114TU | ---- | ---- | ---- |
| D51 | MA143-MC | ---- | ---- | ---- |
| CF52 53 | CTF1193 | CTF1247 | CTF1247 | CTF1247 |
| R58 | RS1/16S563J | RS1/16S473J | RS1/16S473J | RS1/16S473J |
| R60 | RS1/16S473J | ---- | ---- | ---- |
| R61 | RS1/16S332J | ---- | ---- | ---- |
| R65 | RS1/16S273J | ---- | ---- | ---- |
| R101 | RS1/10S331J | RS1/10S471J | RS1/10S471J | RS1/10S471J |
| R104 | ---- | RS1/16S563J | RS1/16S563J | RS1/16S563J |
| R151 152 | RS1/16S222J | RS1/16S152J | RS1/16S152J | RS1/16S152J |
| C101 | CKSRYB822K25 | CKSRYB392K50 | CKSRYB392K50 | CKSRYB392K50 |
| C104 | ---- | CKSRYB103K25 | CKSRYB103K25 | CKSRYB103K25 |
| C110 | CEVR22M50 | CEV010M50 | CEV010M50 | CEV010M50 |
| C112 | CKSYB104K25 | CSZSR47M20 | CSZSR47M20 | CSZSR47M20 |
| C151 152 | CKSRYB273K16 | ---- | ---- | ---- |
| C161 162 | ---- | CKSQYB563K25 | CKSQYB563K25 | CKSQYB563K25 |
| FM Front End | CWB1064 | CWB1063 | CWB1063 | CWB1063 |

Display Unit

| | M980RDS/EW | M980/UC | M940/ES | M77/US | M980RDS/X1B |
|---|---|---|---|---|---|
| LCD | CAW1140 | CAW1141 | CAW1141 | CAW1141 | CAW1181 |
| IL903-908 | CEL1013 | CEL1025 | CEL1025 | CEL1025 | CEL1013 |
| S905 915 | CSG1041 | ---- | ---- | CSG1041 | CSG1041 |
| D910 | MA110-1A | ---- | ---- | ---- | MA110-1A |
| D906 | CL150URCD | CL150URCD | CL150URCD | CL150URCD | CL150RCD |

# 16. CIRCUIT DESCRIPTION

## 1. Preamplifier Stage

This unit processes a pickup output signal to make signals for subsequent stages, i.e. servo unit, modulator unit and control unit. The signal from the pickup is converted on an I-V basis in a photodetector-builtin preamplifier inside the pickup.
Besides, an addition is made to the signal in an RF amplifier (IC351) to obtain RF, FE and TE signals.
The preamplifier unit has a configuration with one-chip IC UPD1347GS mainly employed. It is described in detail below.
The present system, which is of single power (+5 V) type, has 2.5 volts available for both RF Amplifier Reference Voltage Vref and other signal circuit reference voltage REFOUT. Voltages referred to below are to be expressed in Unit [REFOUT]. (A voltage based on a reference value of 0 (V) is to be expressed in Unit [V] . )
The IC is a 36-pin flat package, which has an internal configuration as shown in Fig. 62.
This IC is described below concerning its internal component parts.
(NOTE) Pin ⑱ on IC351 has Vref (2.5 V), which in turn serves as the reference voltage in the RF amplifier. For measurements, adjustments, etc., apply REFOUT obtained by passing REFO of Pin ⑲ on IC601 through a buffer.

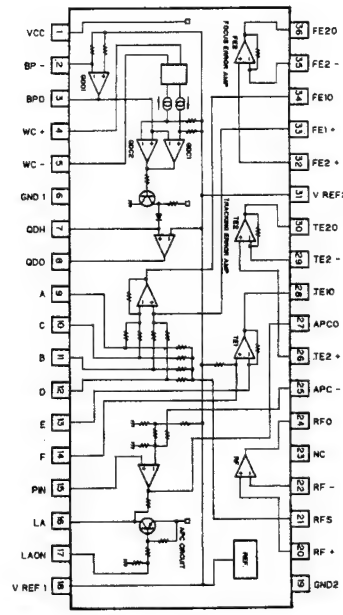



Fig.62 Block diagram

### (1) RF amplifier

Photodetector Outputs A, B, C and D are added in amplifier (1) so that (A + B + C + D) will be outputted to RFO. (This terminal permits an eye pattern to be checked.) RFO output voltage VRFO has lowfrequency components as follows:

$$VRFO\ [REFOUT] = -[(R358 + R353)/10\ k] \times (A + B + C + D)$$

For RFO output (Pin ㉔, an RF output at a level of VRFO= 1.9 Vp-p', AC., is available, with REFOUT at the center.

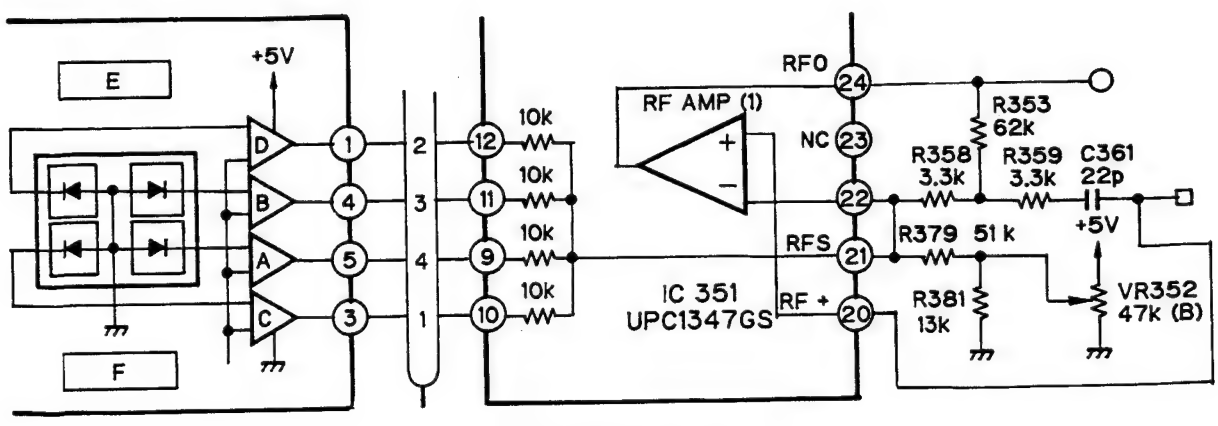



Fig.63 Block diagram

### (2) Focus error amplifier

Photodetector outputs A, B, C and D are inputted to both differential and focus-error amplifiers so that A + C − B − D will be outputted.

An FE output volatage (low frequency) will be :

$V_{FE} = 5 \times 25\ k/R_A \times (A + C - B - D)$[REFOUT]

An FE output (Pin ㊱) of about 2.5 (V) is available as an S-shaped curve.

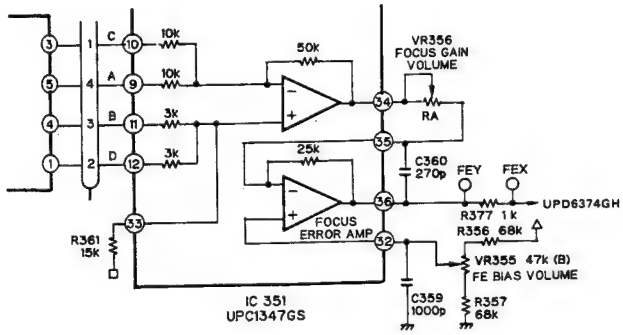



Fig.64 Focus error amplifier

### (3) Tracking error amplifier

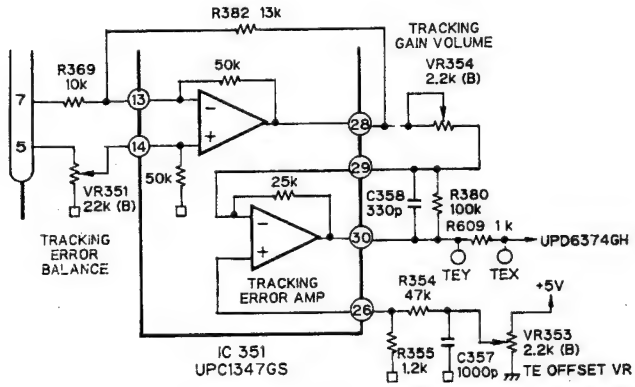



Fig.65 Tracking error amplifier

The side-spot voltages inputted to E and F are amplified in differential and tracking-error amplifiers so that an output (E-F) can be obtained.

$V_{TE} =$

$50\ k//13\ k\ /10\ k \times 100\ k//25\ k\ /R_B \times (E-F)$ [REFOUT]

The TE offset VR, moreover, is to cancel a DC offset from the preamplifier to the servo amplifier while the TE balance VR is to adjust the tracking signal symmetry. These are the prerequisites to mainly perform an operation of tracking normally. A tracking error of approximately 2 (v) p-p' is available as an output of pin ㉚.

### (4) APC circuit

A laser diode, if driven at a constant current, will have a negative temperature curve with a large optical output. It is necessary, therefore, to control the current with a monitor photodiode so that a constant output will be available. This is an APC circuit. The present system has LDI set to approximately 50 thru 60 mA.

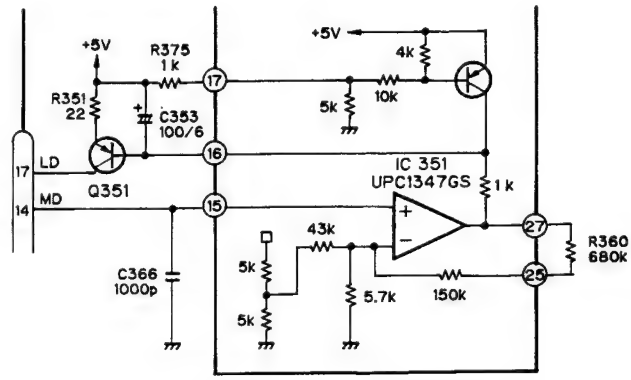



Fig.66 APC circuit

## 2. Servo Stage

This unit has FE, TE and RF outputs received as its inputs from the RF amplifier. And the analog signals are converted to the digital ones, which are in turn used to execute the servo operations of focus tracking, carriage and spindle and the servo control of in-focus track jump, etc. subject to an instruction from the system microcomputer. IC UPD6374GH (48 pins, flat package) is mainly employed, with the block diagram given in Fig. 67. In addition, this IC has an automatic sequencer built in to perform track jumps, etc; based on the serial data transferred from the system microcomputer. The servo unit is described below on a component by component basis.

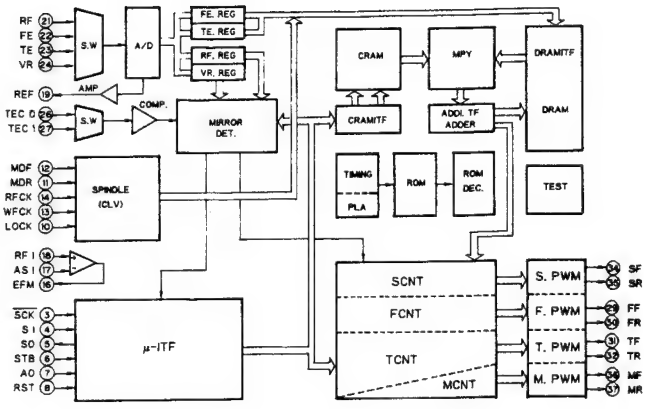
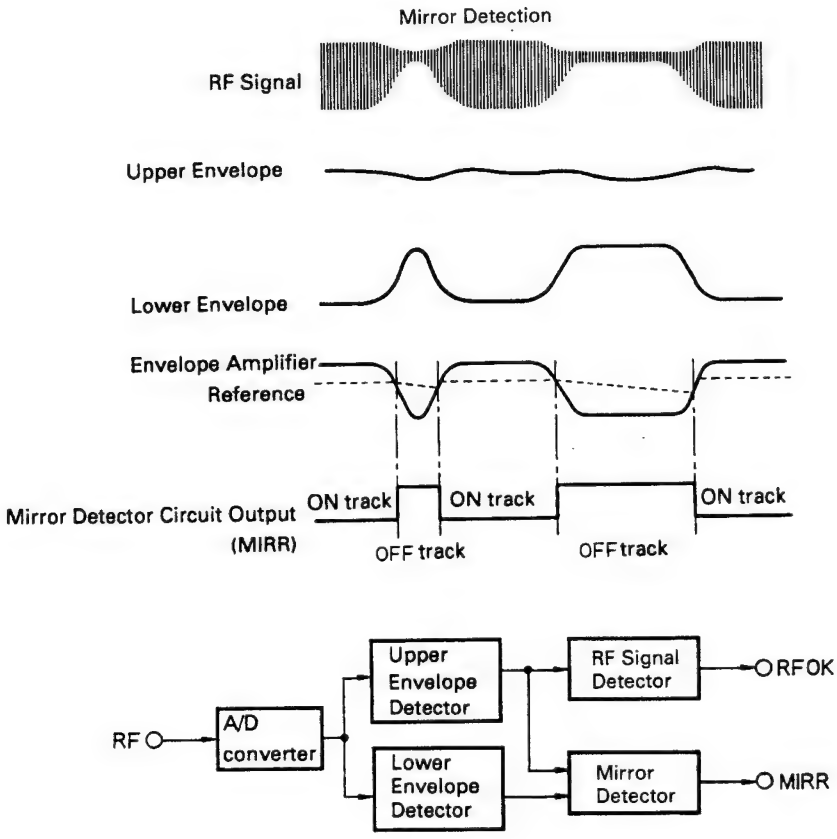



Fig. 67 UPD6374GH Block diagram

### (1) Mirror circuit

The mirror detector circuit is to determine an on-track or off-track status by detecting a mirror status, with an envelope amplitude extracted from an RF signal. For the reference to detect a lack of amplitude, the envelope amplitude is held at the peak with a sufficient large time constant and multiplied by two-thirds to obtain the reference value. Should an RF signal have no amplitude available (with the focus servo removed), the mirror detector circuit has an output (MIRR) go "H."




RF detector / mirror detector circuit block diagram

Fig. 68 Mirror circuit

### (2) Focus OK circuit

The FOK circuit compares the upper envelope of an RF signal with the value set by the microcomputer and outputs a result of such comparison at the FOK terminal. ("H" is outputted, with [RF signal's upper envelope] > [set value].)

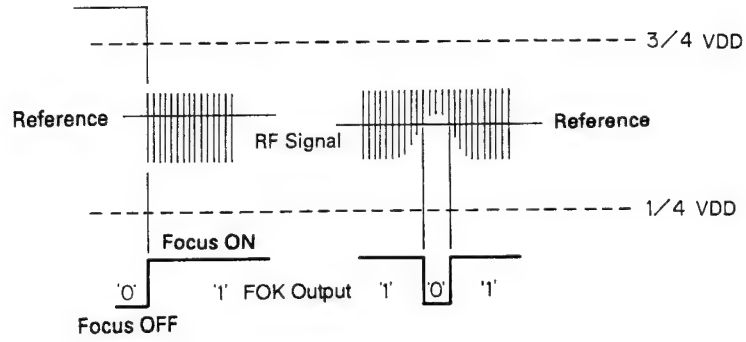



Fig. 69

### (3) EFM comparator

The EFM comparator is to digitize an RF signal. Since its error rate increases under the influence of an asymmetry generated, the EFM output signal is made to pass through a low-pass filter by making use of the fact that a bit is generated at a probability of 50 %. And the signal so filtrated is taken for a comparison level. The present system has a low-pass filter cut off fc = 3.3 (Hz) for C604 and R606 and fc = 1.6 (kHz) for C605 and R607.

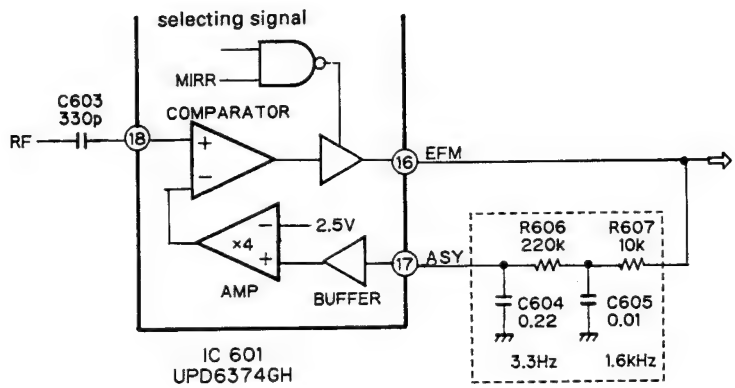



Fig. 70 EFM comparator

### (4) Command code

A list of the commands used in the present system is given below.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10H | SK | TM | TEH | FR | TK | TB | T CNT | BRK |
| 11H | FON | TON | SON | MON | FST | DFCT | JSK | TAB |
| 12H | SLED NON-SENSITIVE AREA | | | | HSL | SCV | RFP | TFP |
| 13H | FOK LEVEL | | | | FSPV 1 | FSPV 0 | T1 | T0 |
| 14H | 00 (h) | | | | | | | |
| 15H | 0 | 0 | 0 | 0 | 0 | TCS | CV2 | E3EN |
| 16H | 0 | 0 | 0 | 0 | FPW | TPW | SPW | MPW |

| | | | | | |
|---|---|---|---|---|---|
| 20H | TRACK KICK LEVEL a | | | | |
| 21H | TRACK KICK LEVEL b | | | | |
| 22H | TRACK KICK TIME A | | | | |
| 23H | TRACK KICK TIME B / TRAVERSE COUNTER N (H) | | | | |
| 24H | TRAVERSE COUNTER N (L) | | | | |
| 25H | SLED KICK LEVEL | SL1 | SL0 | 0 | 0 |

**<Description of Functions>**

SK: sled kick control; the sled is kicked at a value set in 25 H, when SK is set to "1."

TM: tracking mute control
With TM = "1," the tracking output is put by TEH into either PRECEDING VALUE HOLD or REFERENCE HOLD (Data 00 value) mode.
With TM "0," a result of tracking and filtration is outputted (in the normal mode).

TEH: error hold control upon track jump
With SK = TM = "1," the tracking output has PRECEDING VALUE HOLD or REFERENCE HOLD mode selected.
REFERENCE HOLD, with TEH = "0" and PRECEDING VALUE HOLD, with TEH = "1"

FR: output level polarity control upon tracking and upon sled kicking
With FR = "0," a value available at output level registers (20,21 and 25 H) is multiplied by -1 and outputted.
With FR = "1," an output level register is outputted unchangedly.

TK: controlling both track jump trigger and traverse counter load; it has two meanings according to the T. CNT bit.
With T.CNT = "0," set the TK bit to "1" and the track jump sequencer will start.
With T.CNT = "1," set the TK bit to "1" and the traverse counter will be loaded with Values 23 H and 24 H.

BRK: half-wave brake circuit control
With BRC = "1," the half-wave brake is ON.

TB: selecting a tracking filter coefficient bank:
With TB = "0," the tracking filter bank goes 0.
With TB = "1," the tracking filter bank goes 1.
FON, TON, SON and MON: servo output (PWM output) on/off control
With any = "1," the PWM output is on.
With any = "0," the PWM output has stopped.
With PWM output stopped, a high impedance is outputted with the PWM in the single-phase 3-value output mode.

FST: focus search control
With FST = "1," a focus search will be started if FON = 1.

DFCT: tracking output hold control with flaw detected
With DFCT = "1," the tracking hold is outputted upon detection of flaw.

JSK: sled kick control upon jump
With JSK = "1," the sled is kicked at a level set in 25 H for a duration of the track jump.

TAB: track jump sequencer operation abort control
With TAB = "1," the track jump sequencer stops operating.
SLED NON-SENSITIVE AREA: A sled dead zone is controlled at an absolute vale of 4 bits.

HSL: selecting the tracking output hold control
With HSL = "0," the tracking output hold is controlled by a missing FOK signal.
With HSL = "1," the tracking output hold is controlled by means of an external hold.

SCV: selecting a sled servo control with CLV lock
With SCV = "0," the sled servo is turned off (with PWM output stopped) to unlock CLV.
With SCV = "1," the sled servo is normally on, irrespective of whether or not CLV is locked.

RFP: selecting the polarity of data to an RF processor system (circuits to generate FOK, MIRR, etc.)

TFP: selecting the polarity of a tracking error zero cross (TEC) signal

FOK LEVEL:
setting a reference value in the RF detector circuit

FSPW1, FSPW0:
selecting a PWM output carrier

FSPW0: changing a motor system PWM carrier 88.2 kHz with FSPW0 = "0" and 22.05 kHz with FSPW0 = "1."

FSPW1: changing an actuator system PWM carrier 88.2 kHz with FSPW1 = "0" and 176.4 kHz with FSPW1 = "1."

T1, T0: square wave cycle upon focus search

| SETTING | | CYCLE |
|---|---|---|
| T0 | T1 | |
| 0 | 0 | approx. 0.74 sec. ($2^{16}$/Fs) |
| 0 | 1 | approx. 1.49 sec. ($2^{17}$/Fs) |
| 1 | 0 | approx. 2.97 sec. ($2^{18}$/Fs) |
| 1 | 1 | approx. 5.94 sec. ($2^{19}$/Fs) |

20 H, 21 H:
register to set a kick level upon track jump
22 H, 23 H:
register to set a kick time upon track jump
Kick Time = (set value + 1) × 1/Fs (11.3 µs)
23H, 24H:
traverse counter setting register
25H: sled kick setting register
SLED KIK LEVEL:
sled kick level setting register
SL1, SL0:
selecting SLED FULL KICK or SHORT mode

| SL1 | SL0 | MODE |
|---|---|---|
| 0 | 1 | short |
| 1 | 0 | full kick |
| 0 | 0 | normal kick |

TCS: selecting the tracking zero cross comparator
TECO input, with TCS = "0" and
TEC1 input, with TCS = "1"
CV2: selecting the sensitivity of CLV error detector with speed doubled
Normal speed selected, with CV2 = "0" and
Double speed selected, with CV2 = "1"
E3EN: controlling the function of protecting EFM ≦ 3T upon high-speed access
protector off, with E3EN = "0" and Protector on, with E3EN = "1."

## (5) Focus servo system

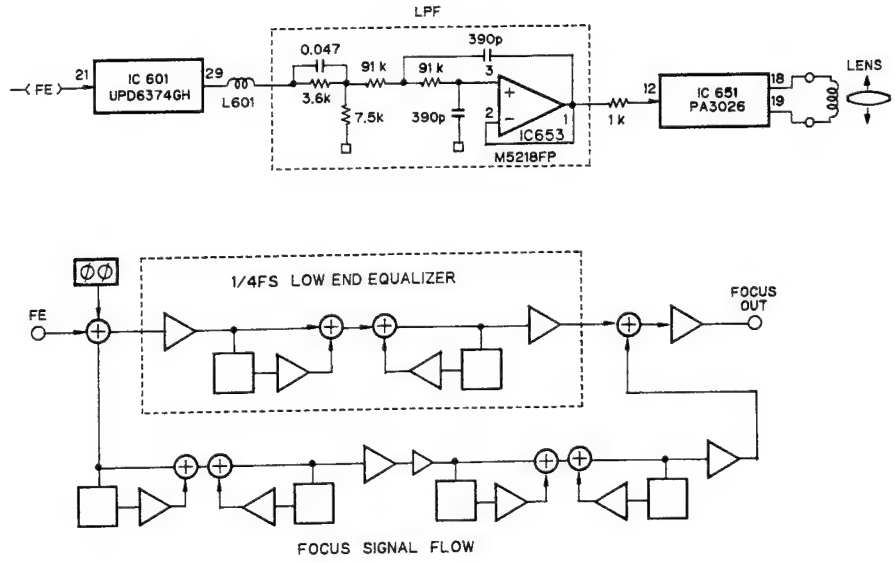



Fig. 71

The digital loop filter is built in the interior of the IC. Sending a coefficient from the microcomputer will allow you to obtain a desired equalizer curve. The present system has an equalizer curve shown in Fig. 75.

a) In-focus
In the in-focus sequence, the lens is driven into a focus S-curve (approx. 10 µm) to close the servo loop on an in-focus basis. A flow of signals in focus is shown in Fig. 72.

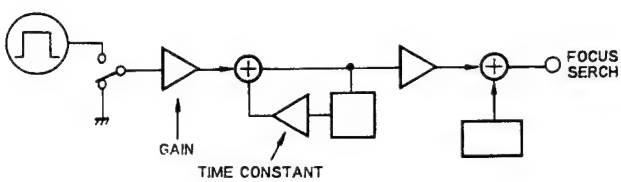



Fig. 72

The search voltage is designed to fall within a range of the lens drive distance ± 1.0 mm, being entirely dependent upon the sensitivity of a focus actuator. In the present system, both gain (voltage) and time constant are determined according to a coefficient from the microcomputer, based on the pulse in a specified cycle, which has been set in a register. The timing in which a focus is to be closed, moreover, is generated, based on the value which has been set as referred to in a signal flow shown in Fig. 73.

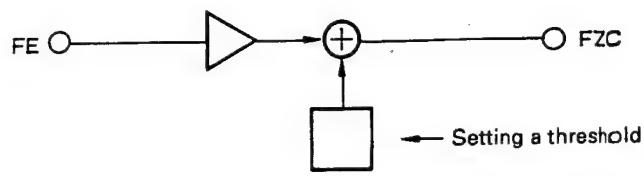



Fig. 73

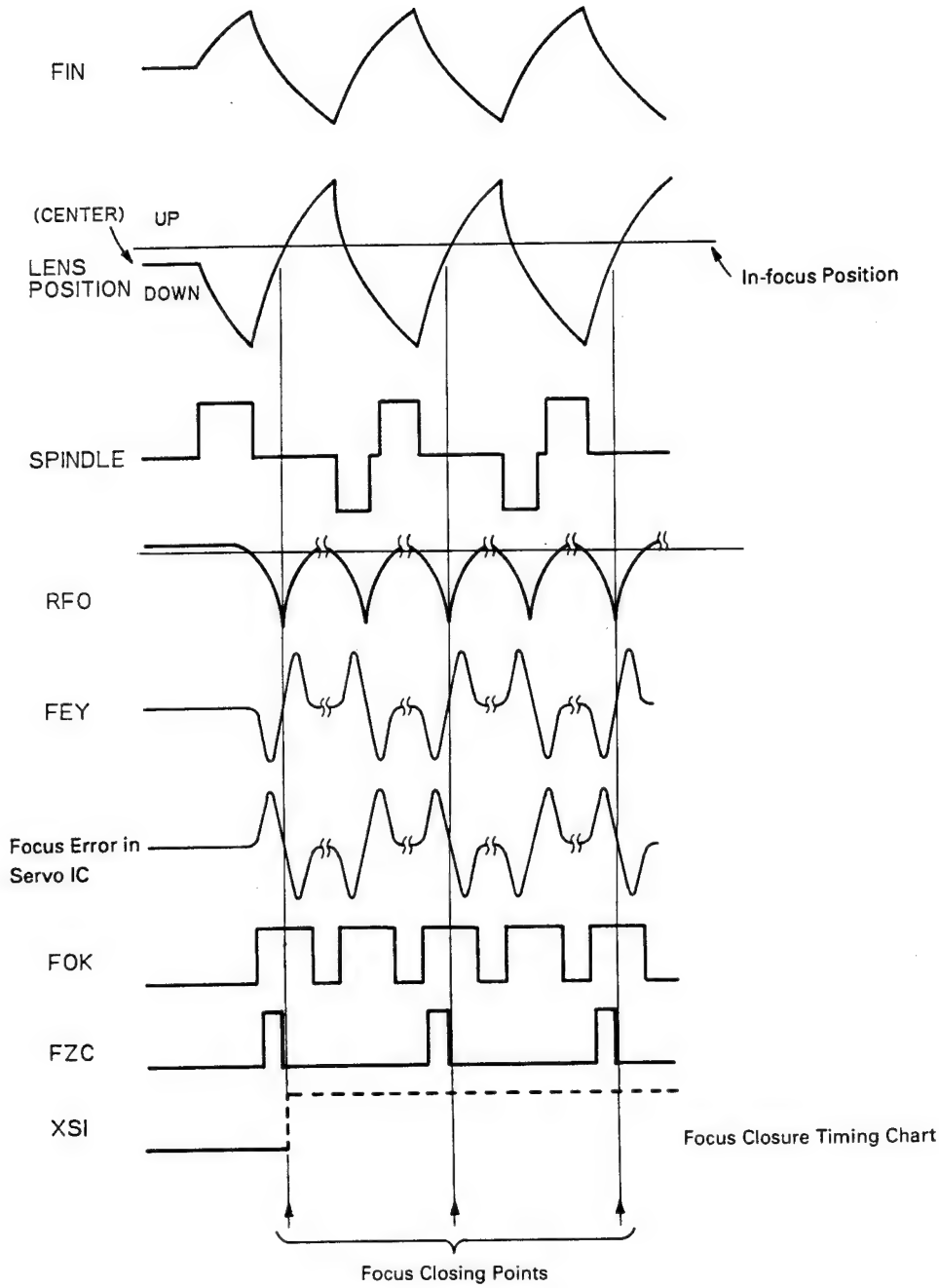

FIN
(CENTER)
UP
LENS POSITION
DOWN
In-focus Position
SPINDLE
RFO
FEY
Focus Error in Servo IC
FOK
FZC
XSI
Focus Closure Timing Chart
Focus Closing Points

Fig. 74

### (6) Focus equalizer

The present system permits a specific equalizer curve to be obtained according to the coefficient sent from the microcomputer. A digital filter built in IC UPD6374GH and an active filter mounted in the exterior are used to obtain a specified equalizer curve.

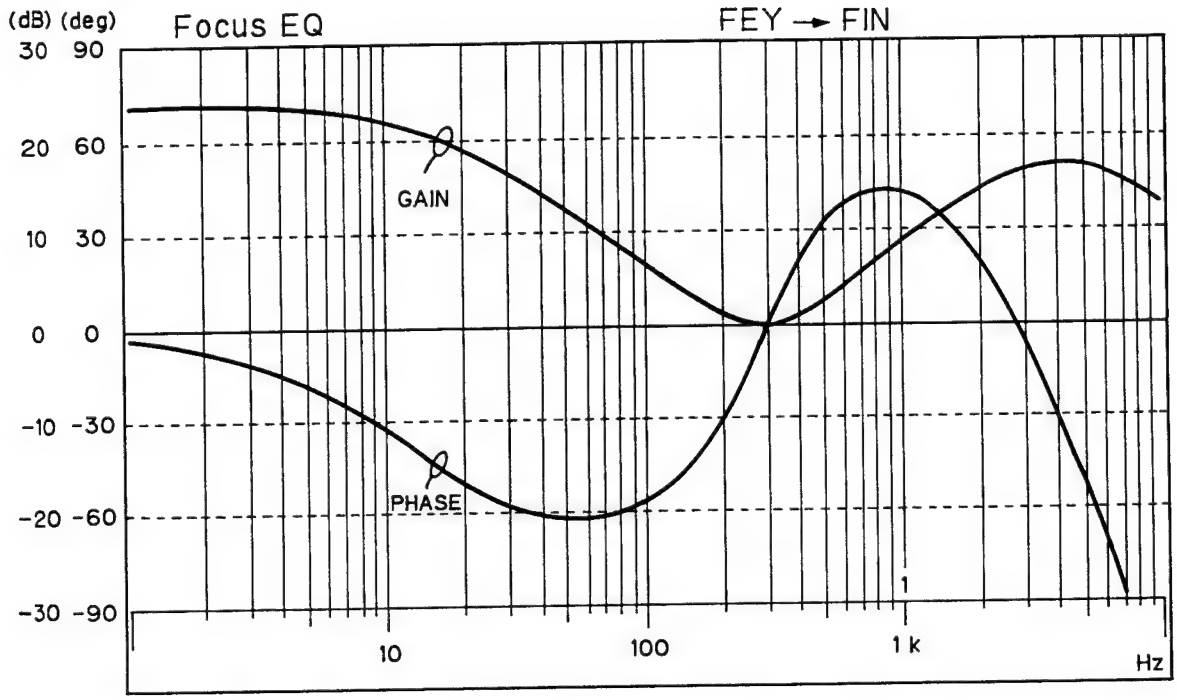



Fig. 75 Focus equalizer

## (7) Tracking carriage servo system

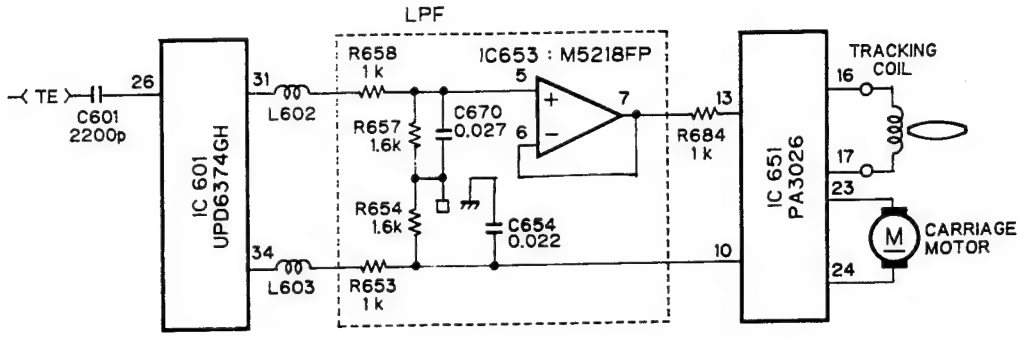



Fig. 76 Tracking carriage servo block diagram

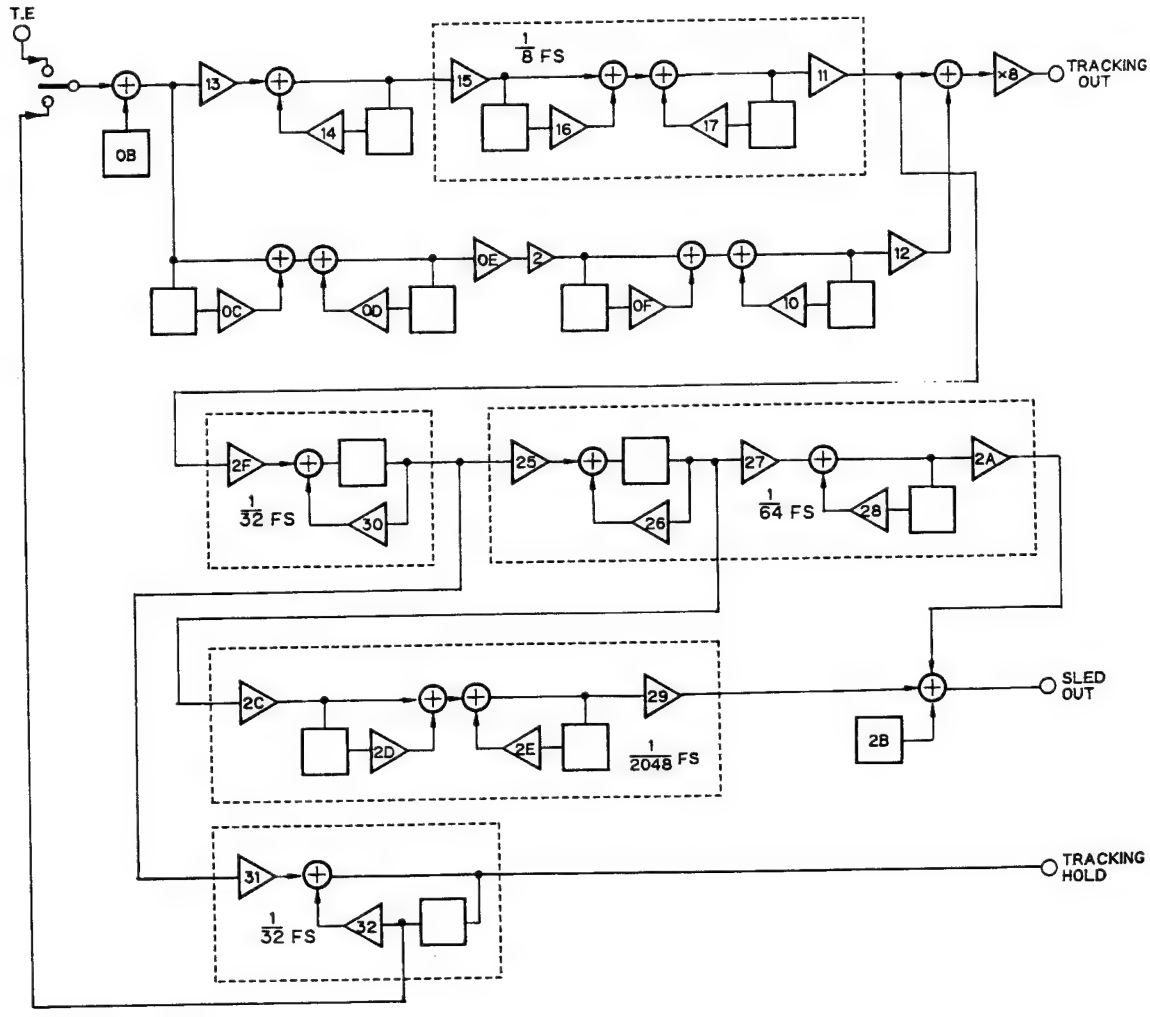



Fig. 77 Tracking carriage signal flow chart

Shown in Fig. 76, 77 are a block diagram of the tracking carriage servo system and a flow of signals in IC UPD6374GH. To make a track jump either forward or reverse, tracking kick and brake voltages and carriage kick and brake voltages are set in related registers beforehand. A jump forward or reverse is made at the voltage which has been set in an instruction from the microcomputer.

a) Traking equalizer

In the present system, a digital filter is built in IC UPD6374HG, allowing a specific equalizer curve to be obtained according to the coefficient sent from the microcomputer. And a passive filter is externally mounted. These two filters are used to obtain a specified equalizer curve. To allow a stable pull-in throughout the search, moreover, the equalizer curve applied is so set as to obtain a higher level of gain than that during the play.
Fig. 78 shows the tracking equalizer curves observed during both play and search.

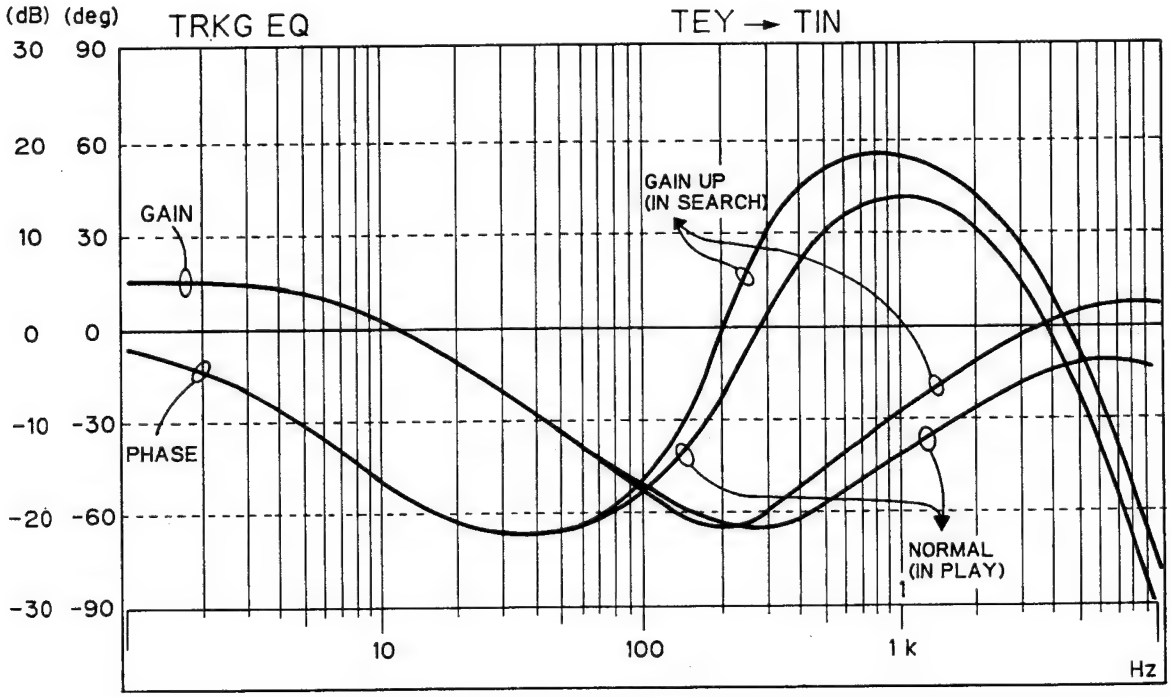



Fig. 78 Tracking equalizer

b) Brake circuit (Fig. 79)

Since the actuator is put into a non-linear status in the in-focus mode or in the track-jump mode, the pull in the servo loop turns out very poor after completion of a jump. While both pickup and disc are relatively moving, the brake circuit permits tracking to be closed smoothly. The direction in which both pickup and disc are moving is detected, based on a phase relation between MIRR and tracking error signals. With an accelerating component only cut off the tracking error, the decelerating component only is used while repeating the ON/OFF operations of servo on a chopper basis.
Thus, a stable pull in the servo loop is performed.
This circuit's ON/OFF operations are controlled by the microcomputer.

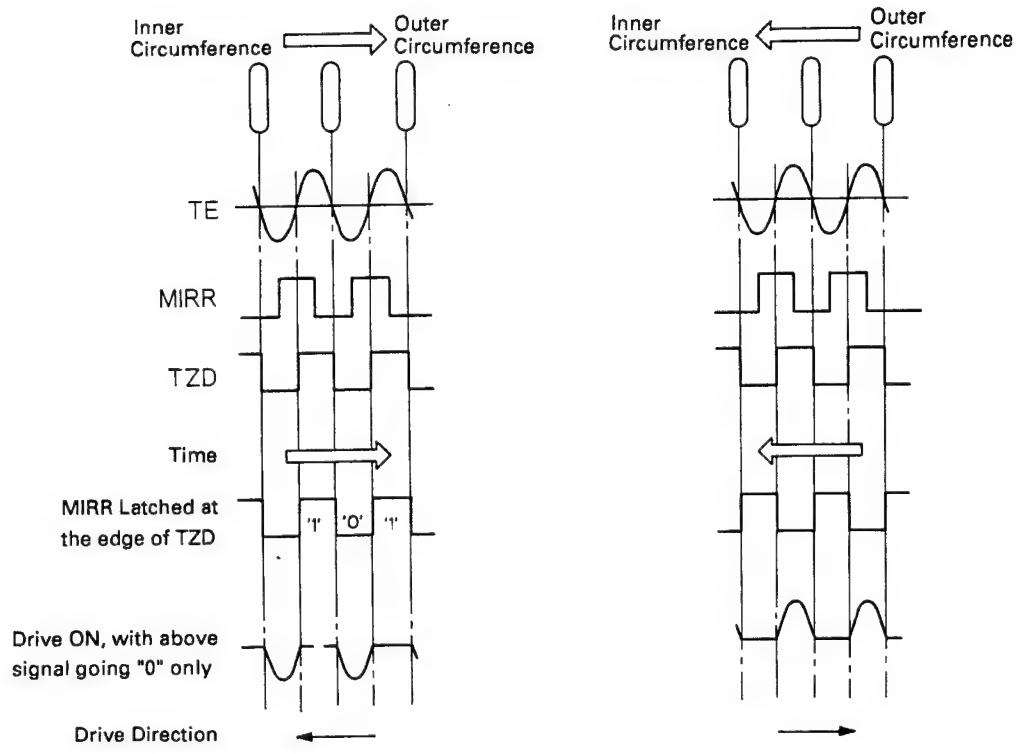



Fig. 79 Brake circuit operation

c) Carriage equalizer

As shown in the signal flow, the carriage servo system takes for an input the voltage at which the tracking actuator is driven. Based on the equalizer curves shown in Fig. 80, moreover, the system obtains those components which are required to feed the carriage. In the present system, a threshold voltage is set beforehand so as to turn on the carriage servo when the tracking actuator has a lens deflection fall outside the range of approximately 130 tracks in relation to the low-pass filter output at the tracking drive voltage.

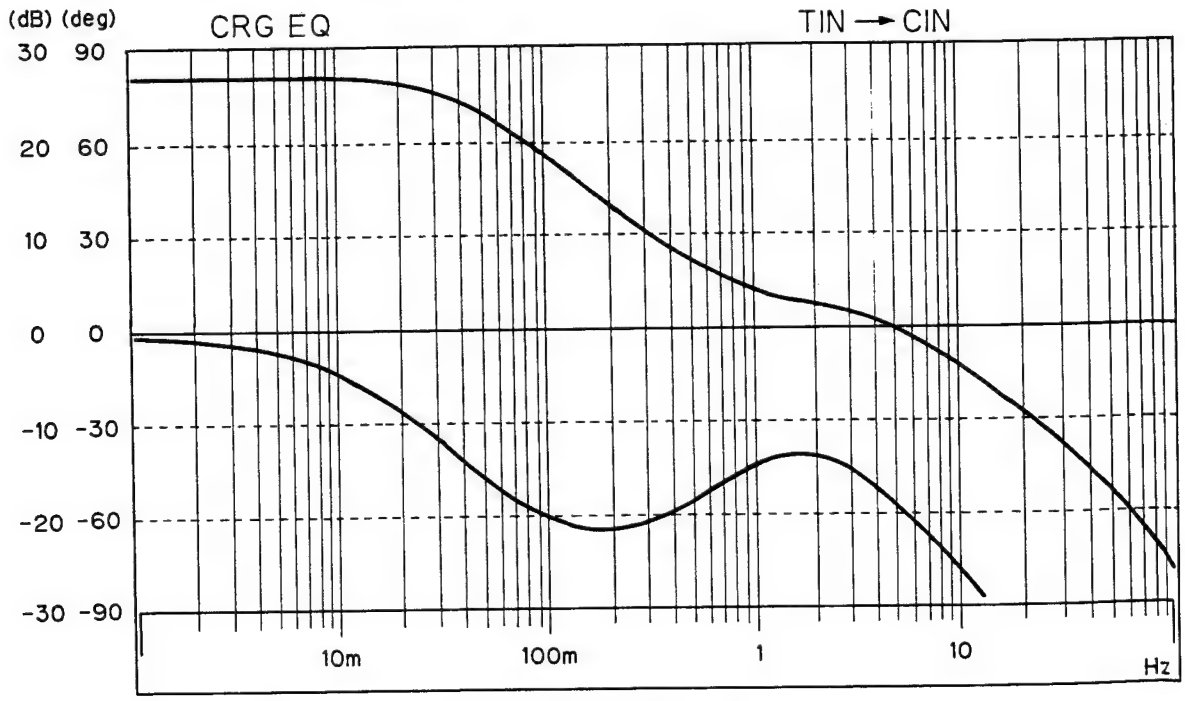



Fig. 80 Carriage equalizer

### (8) Track Jump

The present system is jumping tracks 1, 10 and 32 subject to an automatic sequence of the UPD6374GH. The 64, 80 track jumps conventionally available have been substituted for 32TRK × 2 and 32TRK × 3, accordingly. Fig. 81, 82 shows a timing chart of the 1, 10 and 32 track jumps.

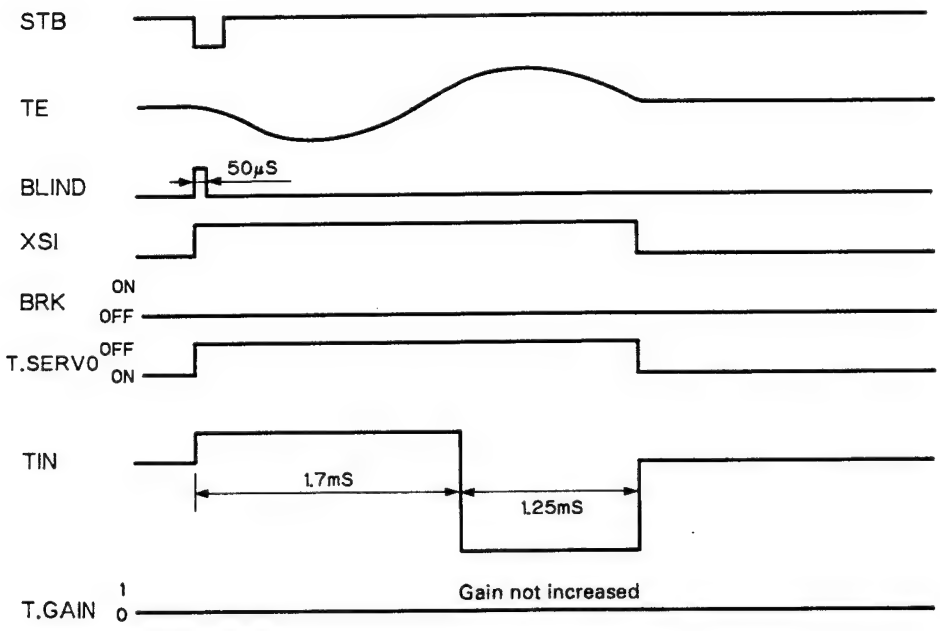



Fig.81 Single jump

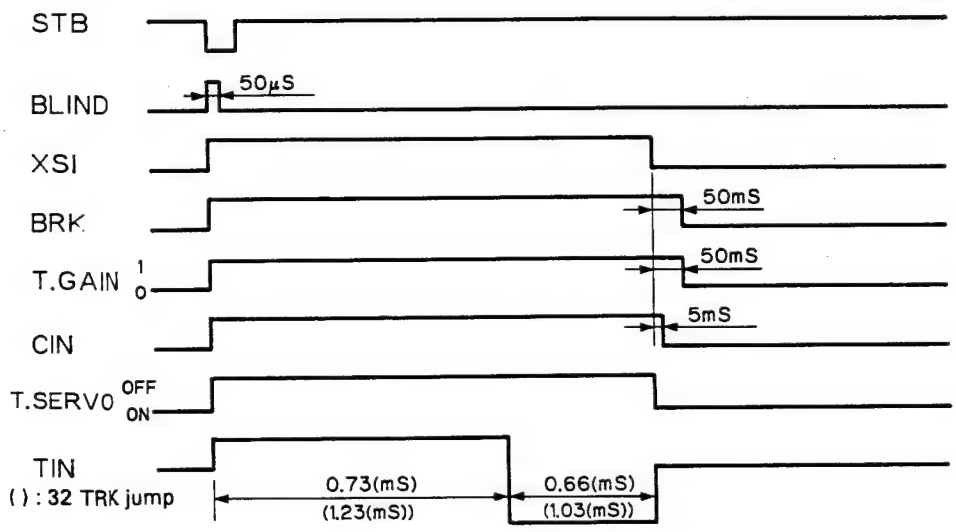
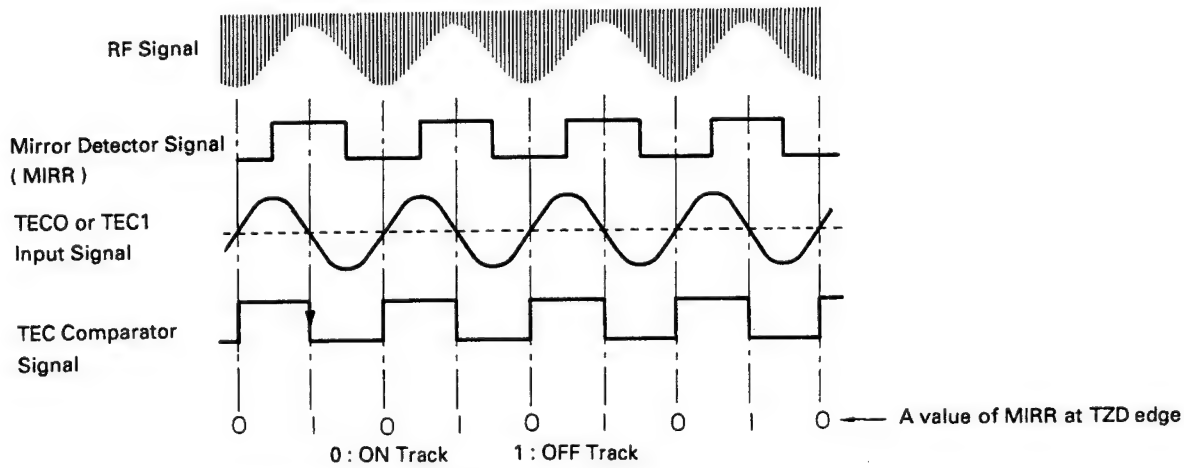



Fig.82 10/32 Track jump

### a) Track jump counter

When tracks are consecutively crossed, a tracking error signal will not fail to cross the DC offset point in both on- and off-track modes as shown in Fig. 83. This point, threrfore, is used to determine either on- or off-track so as to count the number of cycles in which the on-track is switched over to the off-track. A count value is set by the microcomputer. And this count value is given priority to the kick-setting time.




The number or cycles in which 0 changes to 1 should be counted.

Fig.83 Track count jump

## 3. CLV Control Stage

### (1) CLV control command and CLV mode command

MSB LSB

| D | I | L | G | T | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| D | 0 | RFCK/4 and WFCK/4 | Select a steady servo phase comparison signal. |
| | 1 | RFCK/8 and WFCK/8 | |
| I | 0 | RFCK/16 | Select a bottom hold cycle of pull-in and rough servos. |
| | 1 | RFCK/32 | |
| L | 0 | MDF, MDR (H, Z) outputs | Select an MDF/MDR output terminal selecting method. |
| | 1 | MDF, MDR (H, L) outputs | |
| G | 0 | −12 dB | Select the gain of pull-in and rough servos. |
| | 1 | 0 dB | |
| T | 0 | RFCK/2 | Select a peak hold cycle of pull-in servo. |
| | 1 | RFCK/4 | |

| D2 | D1 | D0 | MDF | MDR | Control Status |
|---|---|---|---|---|---|
| 0 | 0 | 0 | L | L | stop |
| 0 | 0 | 1 | H | L | kick |
| 0 | 1 | 0 | L | H | brake |
| 0 | 1 | 1 | L | L | stop |
| 1 | 0 | 0 | L/H | L/H | pull-in servo |
| 1 | 0 | 1 | L/H | L/H | rough servo |
| 1 | 1 | 0 | L/H | L/H | steady servo |
| 1 | 1 | 1 | L/H | L/H | applied servo |

**• Pull-in Servo**

This servo is used to pull the spindle motor speed into a specified number of revolutions. With a cycle of 8.6436 MHz reckoned as T, we can get "22T" (synchronous signal) as the maximum inversion interval of an EFM signal at the specified number of revolutions. Therefore, determine the EFM signal's maximum inversion interval and compare it with "22T" so that we can detect whether the motor speed is higher or lower than the specified number of revolution.

| EFM SIGNAL MAX. INVERSION INTERVAL | MDF TERMINAL | MDR TERMINAL | MOTOR SPEED |
|---|---|---|---|
| "21T" and below | L(Z) | H | high |
| "22T" | L(Z) | L(Z) | |
| "23T" and above | H | L(Z) | low |

Z: High impidamce

• Rough Servo

This servo is used for the high-speed access in which the carriage is moved at a high speed, with focus servo ON and tracking servo OFF.

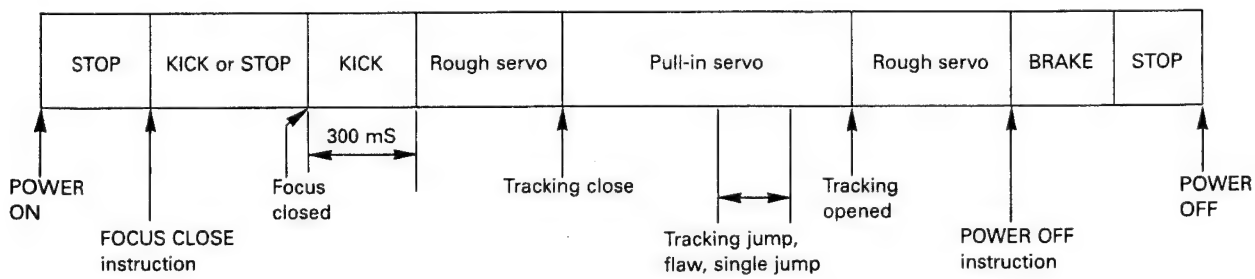
• Steady Servo

This servo is used to maintain the spindle motor speed at a specified number of revolutions.
It is outputted as a result of comparing the phase between WFCK/4 and RFCK/4 or between WFCK/8 and RFCK/8.

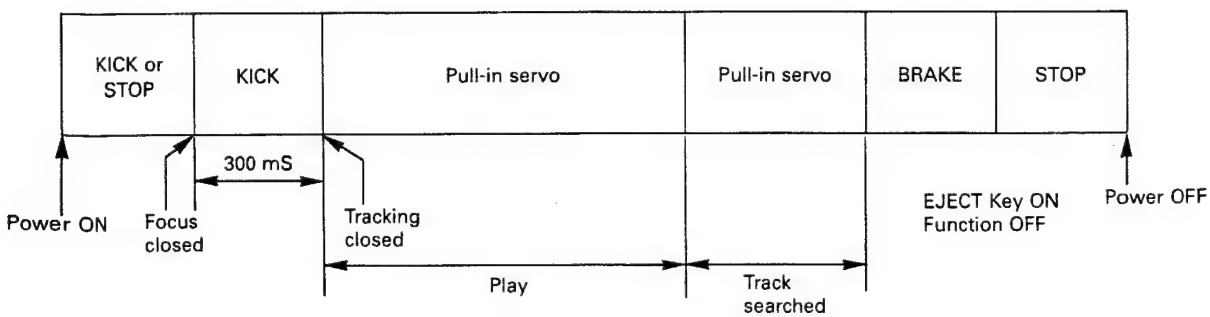
• Application Servo

This is the CLV servo mode available during the normal operation. In the EFM demodulator block, every WFCK/16 is sampled to determine whether or not the frame synchronizing signal coincides with an output of the internal frame counter. As a result, a signal is generated to show whether or not they are coincident. Once this signal has been found not incident in eight consecutive cycles, the status is first determined asynchronous. Under any other conditions, the status is deemed synchronous. The CLV application servo mode automatically selects the pull-in servo in the asynchronous status and the steady servo in the synchronous status. This feature is not employed in the present system.

**• Test Mode**




**• Normal Mode**



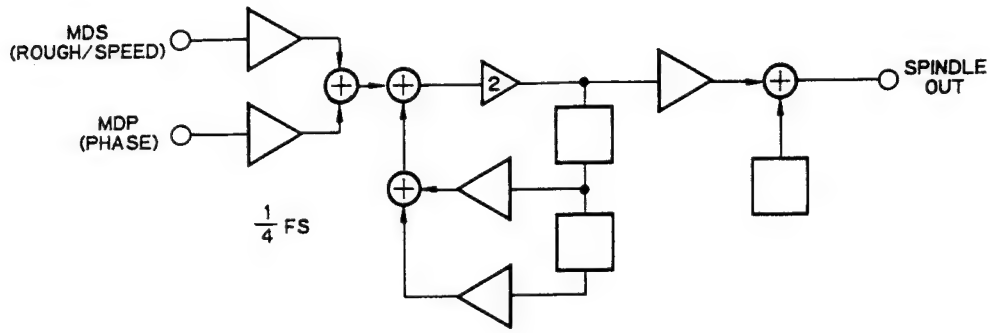



Fig.84 Spindle signal flow chart

### (2) PLL stage

The present system employs a digital PLL circuit illustrated below. This PLL circuit operates so as to lock the rising edge of a PLCK and the edge of an EFM signal. And it has a resolution of as high as approximately eight times IT (T = EFM signal's bit rate = 1/4.3218 MHz). Both frequency divider output frequency and EFM bit rate have their errors automatically regulated to adjust the mean free-run frequency to the bit rate.

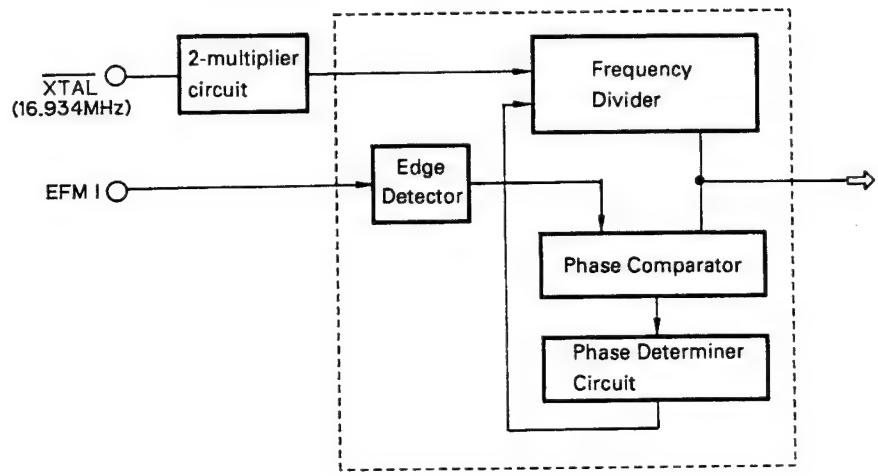



Fig.85 Digital PLL block diagram

## 4. Power Supply Stage

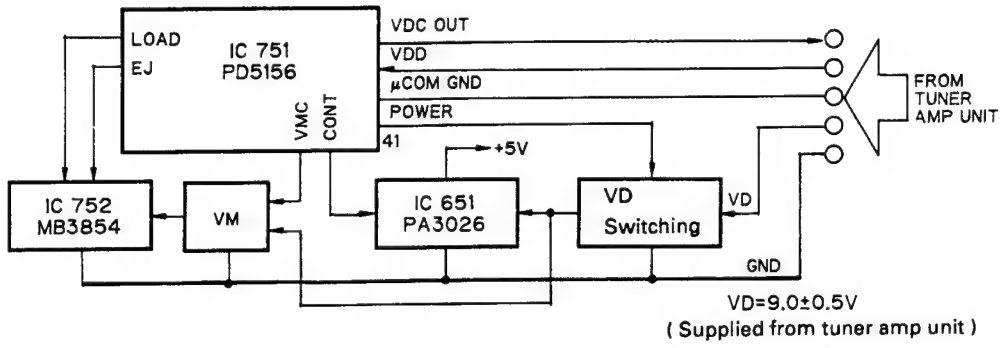



Fig. 86

Fig. 86 shows the block diagram of the power supply unit in the present system.
The present system generates +5 V and loading power supplies, based on the VD (VDD is a power supply for the microcomputer's exclusive use, which is supplied from the product.

1) +5 V System
The +5 V system, which supplies power to CD LSI, is generated by a regulator in IC651. The ON/OFF operations of the +5 V system are controlled through the "POWER" (Pin ㊶ on IC751) in the VD switching unit.

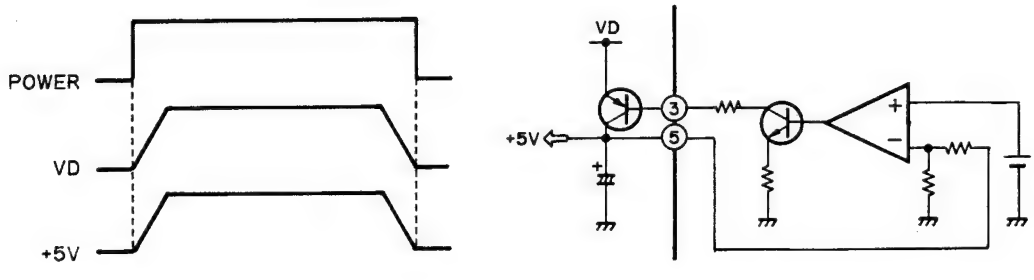



Fig. 87

2) Loading System
A stabilized power supply of approximately 5.4 (V) is provided to supply power to the loading motor drive LSI (VM). It is controlled through the VMC.

## 5. Indicating an Error Number

If the CD should fail to operate in either single or multi mode, or if an error has taken place during the operation and resulted in an error, the player will enter into the error mode. And the cause of such error is numerically indicated.
This is aimed at assisting an analysis or a repair.

### (1) Basic Means of Display

- With ERROR indicated in "MODE" on P-BUS Display date, an error code is transmitte by the use of MIN and SEC.
  Identical date are transmitted with MIN and SEC.
- Examples of Head Unit Display
  E-XX (4 digits)
  Err-XX (6 digits)
  ERR-XX (6 digits)
  ERROR-XX (8 digits)

### (2) Number of Error Codes

100 codes, randing from 00 thut 99; a litte more extensible if "A" and "L" are used.

### (3) Error Codes

| Error Code | Classification | Mode | Description | Detail/Cause |
|---|---|---|---|---|
| 10 | ELECTRIC | SET UP | Carriage home failure | Unmovable to and from the inner circumference<br>→ Home switch failed and/or carriage improper moved |
| 11 | ↑ | ↑ | Focus failure | Focussing failed<br>→ Disk scarred or stained on the back or vibrating hard |
| 12 | ↑ | ↑ | SET UP failure | Spindle failed to lock or subcode extraordinary<br>→ Spindle defective, disk other than audio and ROM |
| 30 | ↑ | SEARCH | Search time out | Target address failed to reach<br>→ Carriade/tracking improperly and/or disk scarred |
| A0 | SYSTEM | — | Power failure | Power overvoltage or short circuit detected<br>→ Switching transistor defective and/or power abnormal |

*In the CD single mode, no error is indicated with the mechanism separately.
If TOC has failed to be read in, the operation will continue anyway.
Error Code A0 is peculiar to the this unit and inapplicable to another future CD player.

## 6. New Test Mode (aging operation and setup analysis)

The CD, either single or multiple, plays in the normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disc number in the multi-mode).
During the setup, the CD software operation status (internal RAM and C-point) is displayed.
The software on the head unit side does not involve any special problem but runs normally.

(1) How to Put in the NEW TEST Mode
See the test mode flow chart page21.
(2) Relations of keys between TEST and NEW TEST Modes.

| P-BUS Commands | Keys | Test Mode<br><br>Regulator OFF | Regulator ON | New Test Mode<br><br>Play in progress | New Test Mode<br><br>Error, Protection ] Talking place |
|---|---|---|---|---|---|
| B0 | CLR/BAND | Regulator ON | Regulator OFF | (REL/CLR) | Time of occurrence, Cause of error ] Selected |
| B1 | TRACK+ | — | FWD-KICK | TRACK+ | — |
| B2 | TRACK− | — | REV-KICK | TRACK− | — |
| B3 | F · 1 | — | TRACKING CLOSE | F · 1 | — |
| B4 | F · 3 | — | TRACKING OPEN | F · 3 | — |
| B5 | F · 2 | — | FOCUS CLOSE | F · 2 | — |
| B6 | — | — | FOCUS OPEN | — | — |
| B7 | — | — | Jump-OFF | — | — |
| B8 | TRACK+<br>TRACK− | To new Test Mode | Jump-Mode selected | TRACK+<br>TRACK− | Occurrence TNo, Time of occurrence ] Selected |

Operations, such as EJECT, CD ON/OFF, etc. are to be performed normally

## (3) Error Cause (Error Number) Code

| Error Code | Classification | Mode | Description | Cause/Detail |
|---|---|---|---|---|
| 40 | ELECTRIC | PLAY | FOK = L 100 ms | Put out of focus |
| 41 | ↑ | ↑ | LOCK = L 100 ms | Spindle unlocked |
| 42 | ↑ | ↑ | Subcode unacceptable 500 ms | Subcode failes to read |
| 43 | ↑ | ↑ | Sound skipped | Last address memory operated |

Cause/Detail: Scar, Stain, Vibration, Servo defect, etc...

*With CD single, no mechanical error is displayed while aging. The error code is identical with those in the normal mode.

## (4) Indicating an Operation Status During Setup

| Status No. | Description | Protection operation |
|---|---|---|
| 01 | Carriage home mode started | None |
| 02 | Carriage moving on the internal circumference | 10-second time out |
| 03 | Carriage moving on the external circumference | 10-second time out |
| 11 | Setup started | None |
| 12 | Spindle turn/Focus search started | None |
| 13 | Waiting for focus closing | Failure to focus closing |
| 14 | Spindle kicked and focus checked | Out of focus |
| 15 | Tracking closed and focus checked | Out of focus |
| 17 | Carriage closed and focus checked | Out of focus |
| 18 | Lock, subcode ] Waiting | Failure to lock, Subcode failed to read out of focus |
| 19 | End | None |

**(5) Example of 7-segment Display**

(a) SET UP in progress

| | |
|---|---|
| TRACK MIN SEC<br>11 11 11<br>TRACK<br>11<br>MIN SEC<br>11 11 | While in the TEST MODE, a status number is indicated in TNO, MIN and SEC. |

(b) Operation (PLAY, SEARCH, etc.) in progress Perfectly identical with that in the multi mode.

(c) Protection/Error upon occurrence

| | |
|---|---|
| ERROR-XX<br>Err-XX, ERR-XX<br>E-XX | While in the error mode, an error number is displayed in MIN and SEC. |

Select the display with the CLR/BAND key.

| | |
|---|---|
| TRACK MIN SEC<br>10 40 05<br>TRACK<br>10<br>MIN SEC<br>40 05 | While in the PLAY MODE, an adsolute time is indicated in TNO, MIN and SEC. |

Select the display with the TRACK+ and TRACK− key.

# 17. MECHANISM DESCRIPTION

## • Disc Loading

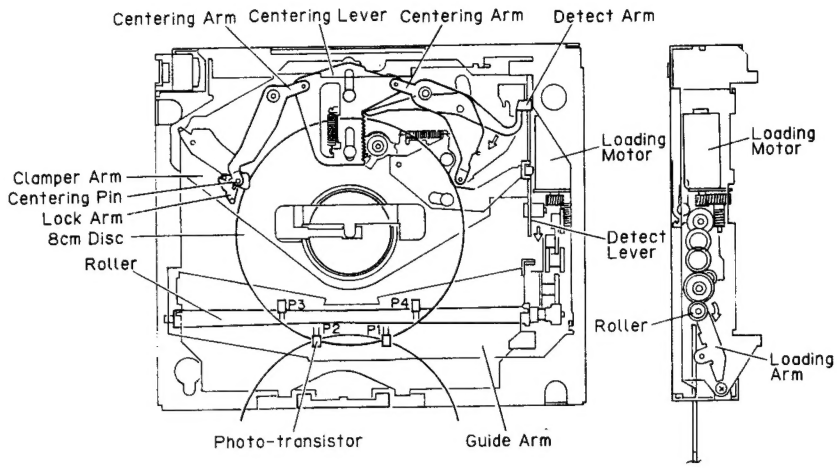



Fig. 88

1. There are four photo transistors on the front and back of the rubber roller that convey the disc, and four corresponding LEDs which light. (The LEDs light when the photo transistor voltage is L.
2. When the disc is inserted to the point in front of the rubber rollers, a H voltage is recorded on the photo transistors in the front section (P1, 2) and the loading motor starts.

3. The motor drive is transmitted via the gears, the rubber rollers revolve and the disc is conveyed.
   The rubber rollers are held on the tip of the loading arm by the strength of the loading arm spring, and the guide arm is in the raised position. This gives the guide arm and rubber roller a suitable adhesive strength to push forward the disc which is positioned between them.

4. The clamper arm distinguishes the size of the disc and has a centering function mechanism which clamps the disc in the center of a spindle motor.
   The centering arm operates as a single unit with the centering lever on top of the clamper arm, to keep the fulcrum movement centered.
   Centering pins and lock arms are attached to the tips of the centering arm. Centering pins are positioned so that when an 8cm disc is placed on the spindle the external edge touches the pins. Lock arms revolve around centering pins. When an 8cm disc is mounted it is locked in place by the clamper arms. When a 12cm disc is mounted, the lock is released and moves according to the broken line in Fig. 89.
   The position of the detect arm which is mounted on the centering arm at the bottom right of the figure differs for 8cm and 12cm discs. When a disc is placed on the spindle the detect lever, which moves in a clockwise direction on the outside edge, moves to the lower section of the figure.

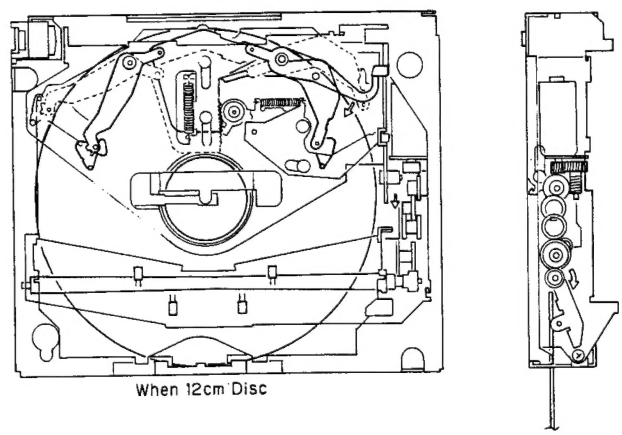



Fig. 89

## • Clamping

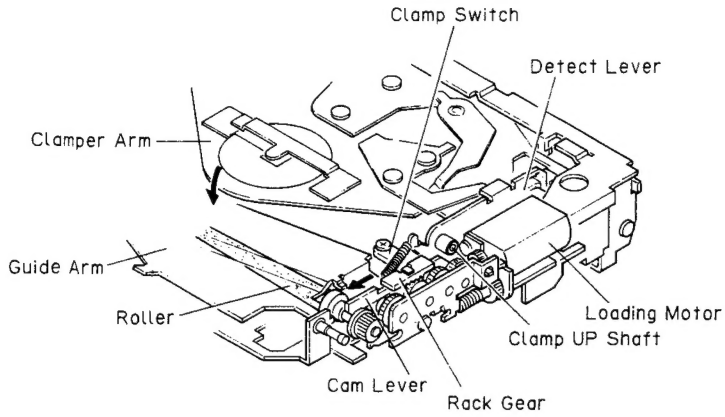



Fig. 90

1. Rack gear that comes into contact with the detect lever, in combination with the gears that are shifted by the loading motor, move the cam lever in the direction of the arrow. Also, the rubber rollers are pushed down by the tapered section on the tips of the cam lever, and move away from the disc. When the clamp switch is switched to ON position by the rack gear arm, loading is terminated.

## • Mechanism Lock

1. In the eject condition two lock arms are positioned in the front frame hole and the front side of the floating section is locked in both vertical and horizontal directions. In line with the movement of the cam lever, the L arm moves the rotating mechanical locking lever to the left.
   The mechanical lock arms L and R move in the directions designated by the arrows and the floating section is released from the frame.

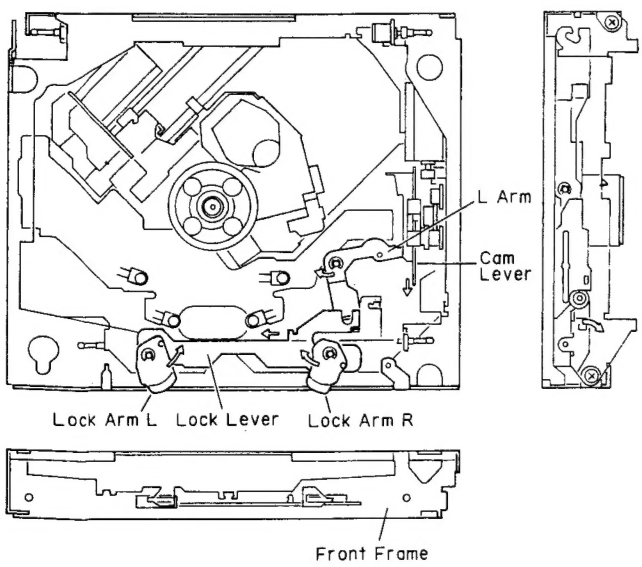



Fig. 91

- **Eject**

1. The eject mechanism operates by reversing the rotation which takes place when the loading motor loads. The cam lever moves and operates the mechanical lock, the clamp is released, the roller is applied, and the disc is conveyed. In the case of a 12cm disc the loading motor stops at the position at which the photo transistor lights at the rear of the rubber roller section. However, in the case of an 8cm disc motor revolution stops after a fixed period of time. In this process the disc type is recognized during the play function, by the voltage of the photo transistor (P1, 2) located in front of the rubber rollers.